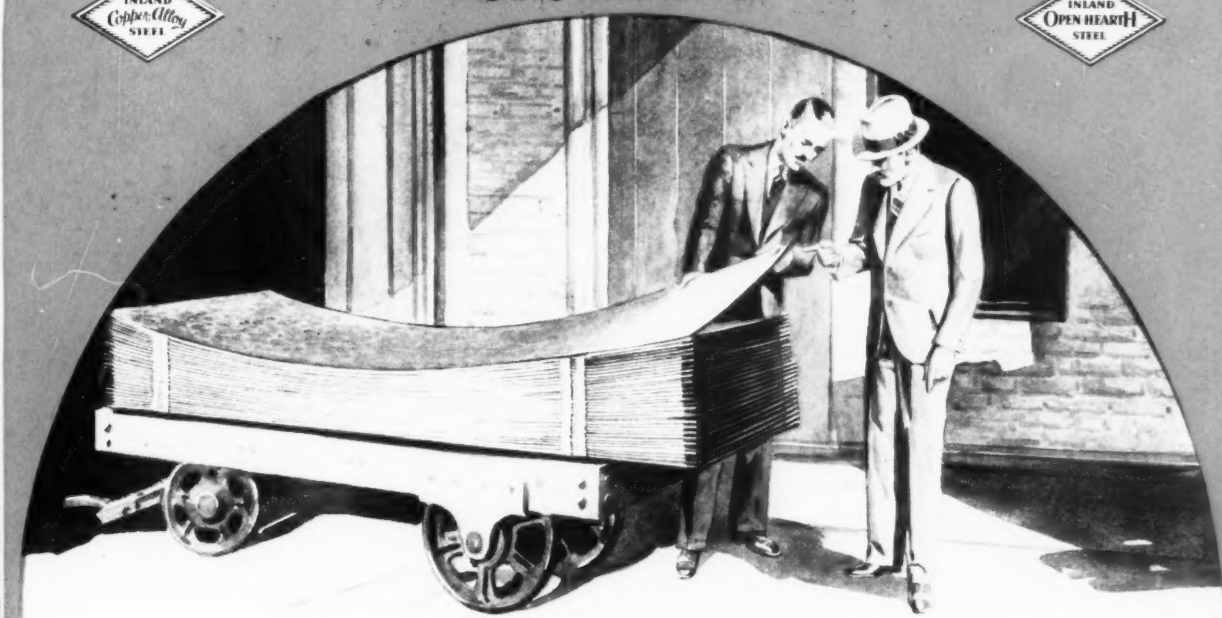


American Artisan

THE WARM AIR HEATING
AND SHEET METAL JOURNAL
FOUNDED 1880

Save with Steel



The Best Material is your Best Backer

Every job is *finally* judged by the material used. The customer has his opinion as to how long the roof, the ventilating system, or some other sheet metal product will last. And if it fails to last that long you are blamed for making a poor selection of material. No matter how good your workmanship has been, your chance for future business is lost.

Back your work, your

reputation, by standardizing on *Inland Steel Sheets*. Made in various grades with various characteristics, *Inland Sheets* fill every need exactly . . . are uniform in quality and workability because they are the result of long experience and perfected skill in steel making. Write for the new booklet, "*Inland Open-Hearth Sheet Steel Products*," describing the many Inland sheets.

INLAND STEEL COMPANY

Sheets
Bars
Plates
Structurals

ABLE SERVANT OF



THE CENTRAL WEST

Rails
Track Accessories
Rivets
Billets

38 SOUTH DEARBORN STREET, CHICAGO

APRIL 26, 1930



CARLOAD BUYING PAYS

IN every section of the country hundreds of dealers have increased their profits through carload purchasing of Agricola Furnaces. They have benefited from the many advantages which come with quantity buying of quality furnaces at competitive prices.

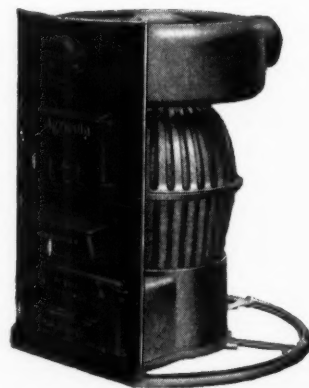
As the foremost exponent of carload business, AGRICOLA has developed a merchandising plan that enables the progressive dealer to expand his sales activities. Write today for the details. No obligation.

AGRICOLA FURNACE COMPANY, Inc.

Gadsden, Alabama

Offices in Principal Cities

THE new Agricola is equipped with one-piece radiator; outside waist-high, shaker handle; built-in smoke consumer and many other advantages found only in the highest priced heating systems.



Agricola

FURNACES

Ever Since 1871 . . .



Makers of Good Goods Only

and

We Will Continue to Build

That Way

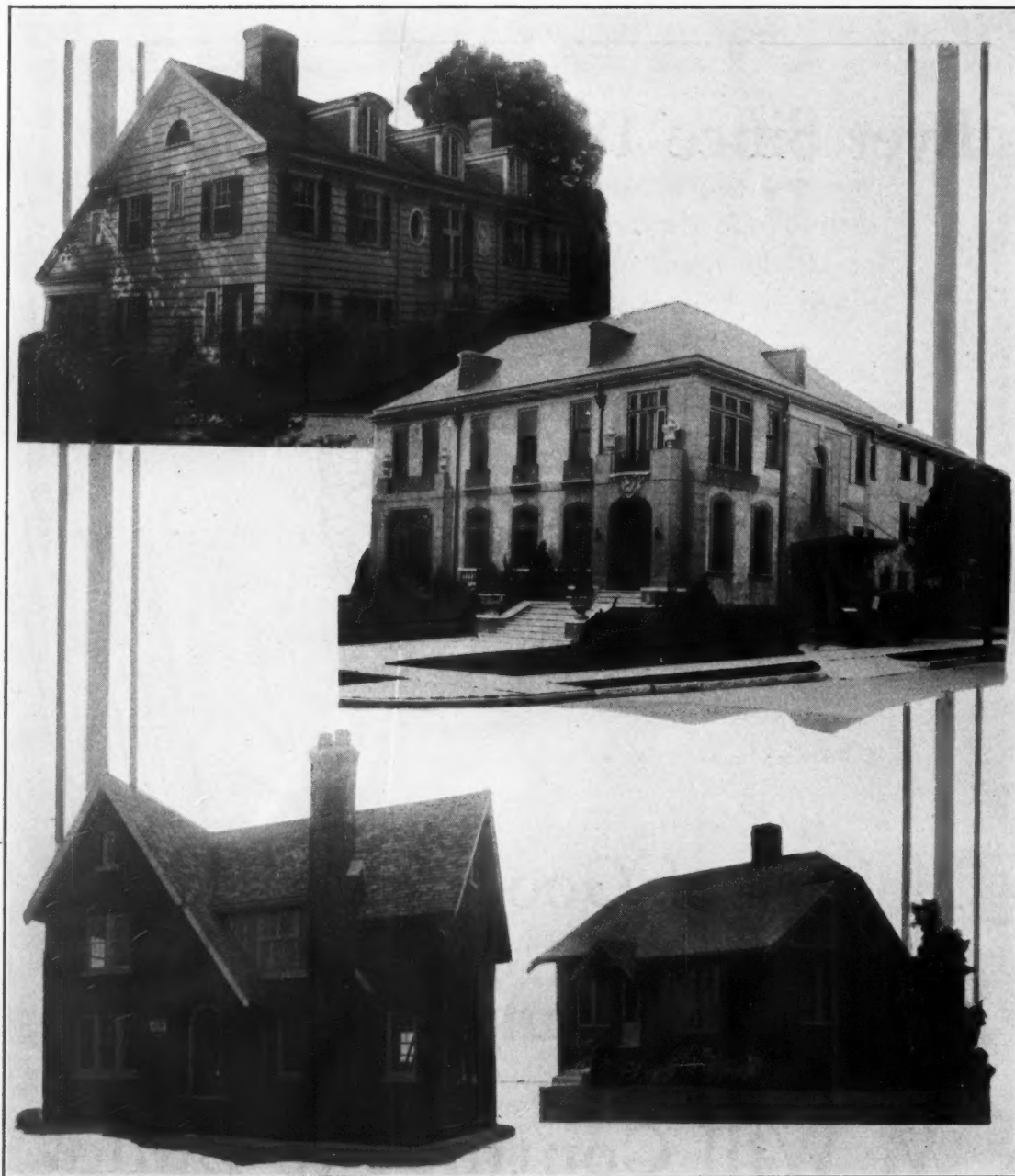
The BECKWITH COMPANY
DOWAGIAC MICHIGAN

Published Every Other Week by Porter, Spofford, Langtry Corp., 139 North Clark Street, Chicago, Illinois. AMERICAN ARTISAN—the Warm Air Heating and Sheet Metal Journal—entered as second class matter, January 29, 1930, at the Post Office at Chicago, Illinois, under the act of March 3, 1879. Formerly entered on June 25, 1887, as American Artisan and Hardware Record.

INDEX PAGES—18 and 56

[VOL. 99, NO. 9—\$2.00 PER YEAR]

BUYERS' DIRECTORY—52 and 54



These four homes—of varying types and sizes—are all heated with

**The
Original
Steel Furnace
Now In Its
Forty-Eighth
Year**

WEIR

**Made by
The Founders
of the
Steel
Furnace
Industry**

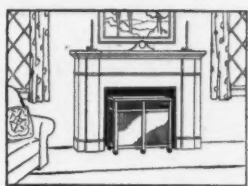
*Dealers find it a very valuable franchise. We will gladly
lay all WEIR facts before you*

THE MEYER FURNACE COMPANY
PEORIA, ILLINOIS

Say you saw it in AMERICAN ARTISAN—Thank you!

Now

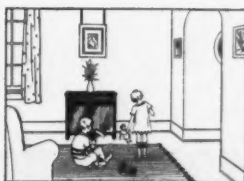
PAYNE offers . . .



IN FRONT of the fireplace, it gives instant, cheerful warmth—without kindling, coal, ashes, smoke, soot or smell! Gas fuel is quick, clean, sure.

***Real
Heating
Luxury
at low
cost!***

WARM AIR circulates into every nook and corner—fills the rooms with fresh, pure air, warmed to exactly the right temperature. Safeguards health!



A Console Heater of Revolutionary New Design

YOU KNOW the sturdy, quality construction of Payne Gas Furnaces. The new Payne Console Heater is built along the same scientific lines—quick-acting, multiple heating element of rust-proof ingot iron welded at all seams and joints—efficient, adjustable burner—double insulated casing, and superior, workmanlike finish throughout. Here is a cabinet-type heater you can *get back of* and push, and *push and PUSH!*

IN OFFICES, too, warm air is more healthful. The new Payne Console Heater looks more like a piece of fine office equipment than a heating device!



THE PAYNE CONSOLE HEATER fills a long-felt need—offering new *beauty and comfort* without extravagance—that spreads the heating load over ten to twelve months of the year. See it and you will agree that it gives you *all-season selling possibilities* no other heater designed for a similar purpose affords! *Full details on request.*

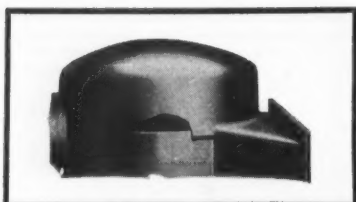


PAYNE FURNACE & SUPPLY CO., Inc.
Beverly Hills, California

There is a "Payne Heat" System for Every Building and Climate!

Payne Heat

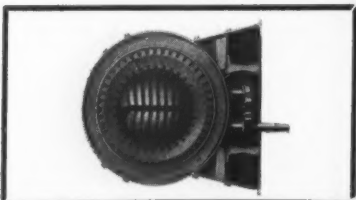
Factory Units
Unit Furnaces
Floor Furnaces
Console Heaters
Central Furnaces
Pipeless Wall Units
Industrial Installations



No Joint at Top of Drum or Pouch

The head of the new Sunbeam Steel Furnace is made in one piece of $\frac{1}{4}$ " boiler plate which fits over the *outside* of the drum approximately 7 inches below the top. Head and drum overlap one inch and are welded together.

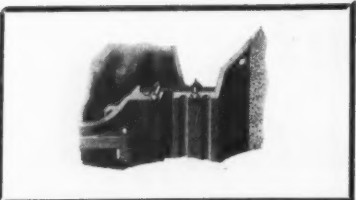
IMPROVED



Duplex Grates

This better and more expensive type of grate can be installed or removed in a few seconds. Upright shaker handle revolves outer ring keeping ashes from accumulating against the walls of the fire pot. Clinkers settle in "basket" where they are dumped without disturbing the fire.

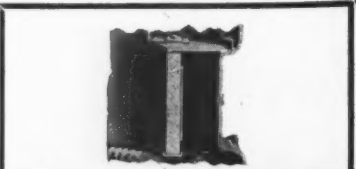
IMPROVED



No Direct Connection Between Drum and Casing

Gas, dust or fumes from the heating unit can never escape into the warm air chamber because of this ingenious patented feature. The casing is not connected to the drum, eliminating the most objectionable joint that can be found.

IMPROVED



Full Height Fire Pot

From grate to bottom of feed door this fire pot measures $14\frac{1}{2}$ inches high. It holds practically twice as much fuel as the ordinary steel furnace.

The New Sunbeam Steel Furnace

Introduced last year with greatest number of innovations in steel furnace history, Sunbeam Steel Furnaces could not be manufactured in sufficient volume to supply the demand. This is evidence, we believe, that dealers and home owners found in this new heating plant, qualities that were not obtainable elsewhere.

However, Sunbeam engineers, not satisfied with producing the one outstanding steel furnace, continued their tests and experiments. Where they found room for improvement, no expense was spared to incorporate their recommendations in these modern heating plants.

A few of the original and of the new innovations are illustrated above. Lack of space prevents a description of all the modern features.

Heating contractors can obtain full details and prices by returning the coupon below.

The FOX FURNACE COMPANY

Elyria, Ohio

*A Division of American Radiator
and Standard Sanitary Corporation*



Please send prices and literature describing the new, improved Sunbeam Steel Furnace to

Name.....

Address.....

City and State.....

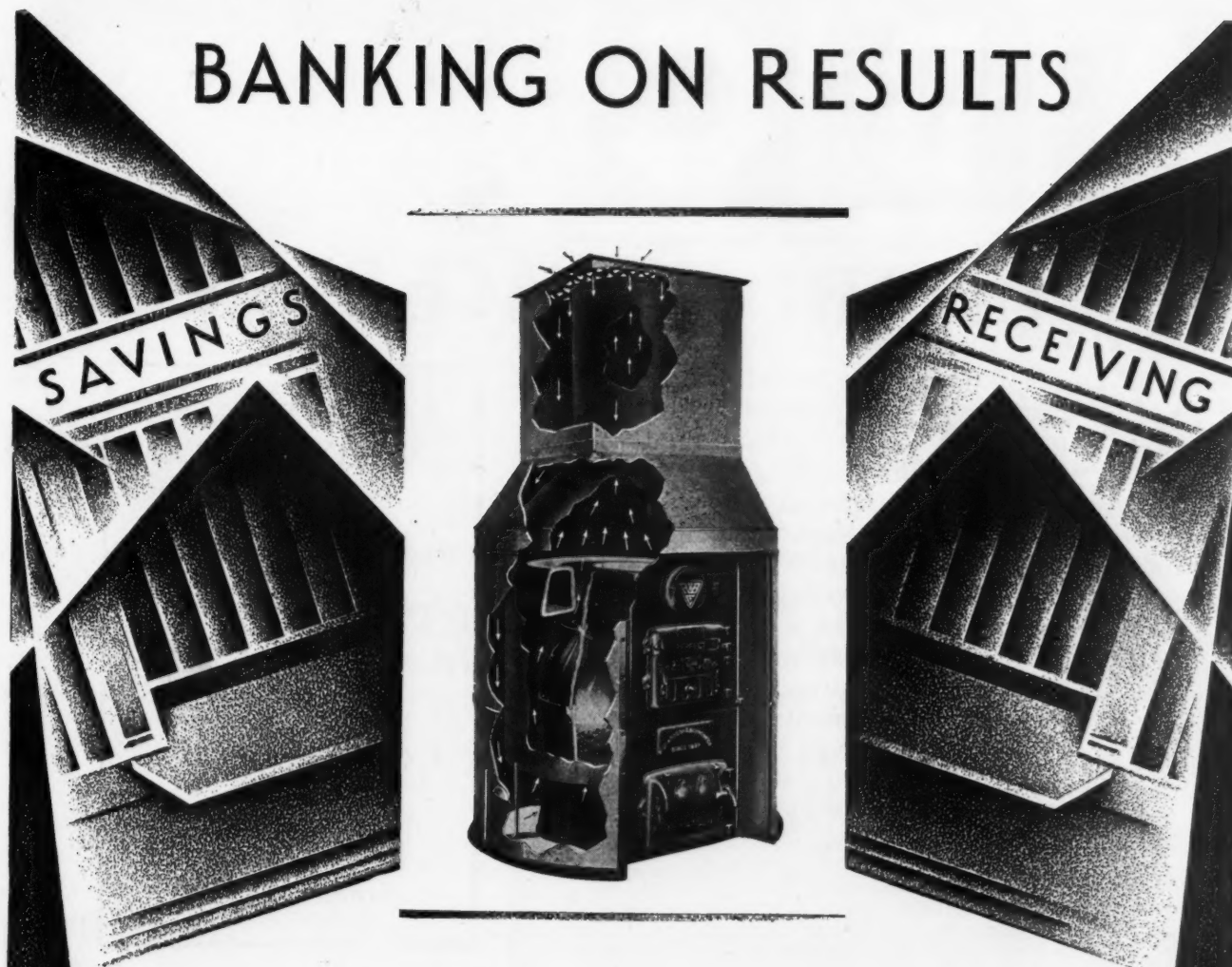
A-5

SUNBEAM

WARM-AIR FURNACES

Say you saw it in *AMERICAN ARTISAN*—Thank you!

BANKING ON RESULTS



EVERY time you sell a "Perfect" Pipeless Heater, your customer banks extra savings and you bank a handsome profit. It's a good piece of business all around. The extra-size air chambers and other exclusive features of the "Perfect" deliver more heat with a smaller consumption of coal than other pipeless heaters. Add that saving to the savings in first cost and you've got the best possible sales story.

Your customers will be proud of your installation. And every one you get boosting the "Perfect" Pipeless means more money in the bank for you.

We believe in and are members of The
National Warm Air Heating Association.

RICHARDSON & BOYNTON Co.

Heating and Cooking Apparatus Since 1837

260 Fifth Ave., New York

Utica, N. Y.

New York Utica Brooklyn Newark Port Chester Philadelphia Boston Chicago Buffalo Minneapolis Cincinnati Detroit Providence

Say you saw it in AMERICAN ARTISAN—Thank you!

A B C's ... OF THE FURNACE BUSINESS

OCCASIONALLY, the furnace dealer stops to ask himself this question, "Am I getting the business I should?" Usually this sets him to wondering if he is taking advantage of all the opportunities right in his own community. In this day of keen competition the money-making furnace dealer is the ultra-progressive one—he is everlastingly on the jump for new business.

During our 39 years of furnace manufacturing, we have watched furnace dealers come and go. We have seen many succeed—some fail. We have also observed why they failed. And we have come to the conclusion that there are 5 things a dealer must do to increase his business. The A.B.C.'s of the furnace business are shown at the right. Have you ever examined your business with these 5 important points in mind?

5 WAYS TO MAKE MORE FURNACE PROFITS

1. *Develop Prospects*
2. *Sell a Good Furnace*
3. *Surpass Competition*
4. *Cut Installation Costs*
5. *Keep Them Satisfied*



THAT 39 years of experience in the furnace business has resulted in the new NIAGARA Furnace. It is the chief factor in the success of many dealers. The NIAGARA accomplishes this because it has many features which are real selling advantages—obviously a furnace of quality. Not only is it easy to sell but easy to install—and its performance makes friends for you. Send for our attractive NIAGARA dealer proposition.

NIAGARA

WARM AIR HEATING SYSTEMS

THE FOREST CITY WALWORTH RUN FOUNDRIES CO.
CLEVELAND, OHIO

Say you saw it in AMERICAN ARTISAN—Thank you!

Quick Sales— Good Profits

NEW!
*the Moncrief
Steel Furnace*

Isn't it only natural that a well designed good looking furnace like the Moncrief will sell most easily?

Especially when it has built-in quality all through.

The Moncrief line includes a size and type for every home

heating need. The new Moncrief Steel Furnace provides a new source of profit for Moncrief dealers.

Right now is the time to get in on the Moncrief proposition for the season's business.

Write for particulars

THE HENRY FURNACE & FOUNDRY CO.

3471 East 49th Street

Cleveland, Ohio

*We supply everything
used on a Warm Air
Heating Job*

DISTRIBUTORS

Carr Supply Co., 412 North Dearborn Street,
Chicago, Ill.

The Henry Furnace & Foundry Co., Pittsburgh,
Pa.

Frontier Water & Steam Supply Co., 366 Oak
Street-481 Elliott Street, Buffalo, N. Y.

Johnson Furnace Co., Kansas City, Mo.

E. A. Higgins, 1112 Douglas Street, Omaha,
Neb.

Moncrief Furnace & Mfg. Co., Dallas, Tex.

E. W. Burbank Seed Co., 29 Free Street, Port-
land, Me.

J. F. Conant Ry. Term. Warehouse, Troy, N. Y.

Wilkes-Barre Hdwe. & Stove Co., 18-20 South
Washington Street, Wilkes-Barre, Pa.

The Crawford Heating Co., Steubenville, Ohio.

Stockhoff Supply Co., St. Louis, Mo.

Follansbee Bros., 324 South Missouri Street,
Indianapolis, Ind.



The SERIES "C"

MONCRIEF

Say you saw it in AMERICAN ARTISAN—Thank you!

These are mighty good reasons why WISE furnaces are leaders in quality and sales—



—exclusive patented radiator design

THIS construction eliminates the objectionable dirt collecting and clean-out nuisance of the ordinary flue types. Feed chamber and top radiator are constructed to allow communication between them bringing the opening of the fire flues of the radiator directly into the feed chamber.



—a new cellular one-piece firepot

THIS new and better firepot construction supplies an even distributed air blast which provides complete combustion. Another feature is the Elbow Shaped Flue Collar on the inside of the radiator turned up so the heat within the radiator must follow the castings to the top before entering the flue.



—a cast iron soot box and clean-out

THE big weak spot in steel furnace construction is eliminated in the Wise Steel Furnace. The exclusive feature of having a cast iron box and clean-out on the radiator gives you a quality selling point not found in any other steel furnace. The Wise Steel Furnace is both riveted and welded. It is made of heavy steel and has large radiating surfaces.

THESE are only the outstanding features of each Wise Series of quality furnaces. For over thirty-seven years Wise Furnaces have been constantly improved—they have all the modern features found in other high grade furnaces in addition to these exclusive patented points of construction.

With the complete Wise line you can confine your purchases to one source—you can beat competition on a quality basis at prices that allow you a larger profit.

Progressive dealers in open territories can secure valuable exclusive agency rights.

Send for Wise agency details and the Wise catalog today.

THE WISE FURNACE CO., AKRON, OHIO

WISE FURNACES

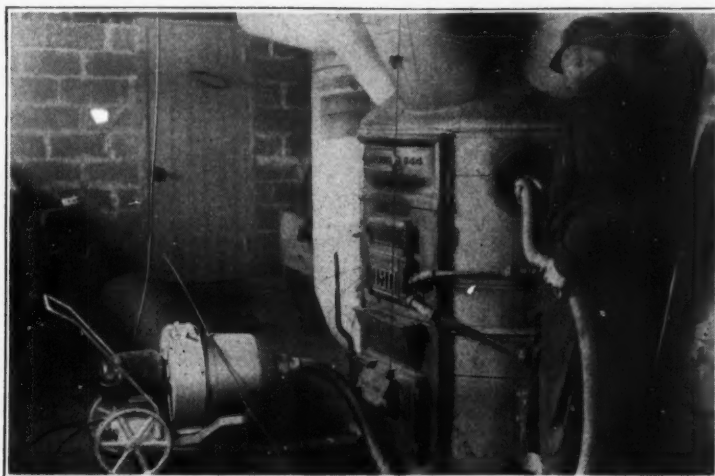
Say you saw it in AMERICAN ARTISAN—Thank you!

High Quality Is Always Your Best Bet—



FOLKS may not know what a certain article *should* cost but most people do know high quality when they see it. That's why the Brillion nets you a larger profit—its quality is unmistakably high—its features are readily recognized as being better and yet (*because of low manufacturing costs and a different sales policy*) its price is low. Go after more business at a better profit with—

BRILLION FURNACES



cleaner—light, powerful, easy to use and economical. Ask about it now—send the coupon.

BRILLION FURNACE COMPANY
200-300 Park Avenue
Chicago Office
3215 Elston Avenue
BRILLION, WIS.

ARE you still allowing the other fellow to get into the basements of your prospects? Are you still overlooking the fact that *furnace cleaning* is the best method of *earning extra profits* by discovering repair jobs and faulty installations? Brillion dealers are finding the

BRILLION FURNACE CLEANER

an efficient money maker because it gets the repair jobs and many new furnace installations as well. It is an ideal

A. A.

**BRILLION
FURNACE CO.**

Gentlemen:

Convince me that Brillion Furnaces are high grade and sell at a price unusually low for such quality. Send me details on the Brillion Furnace Cleaner also.

Name.....

Address.....

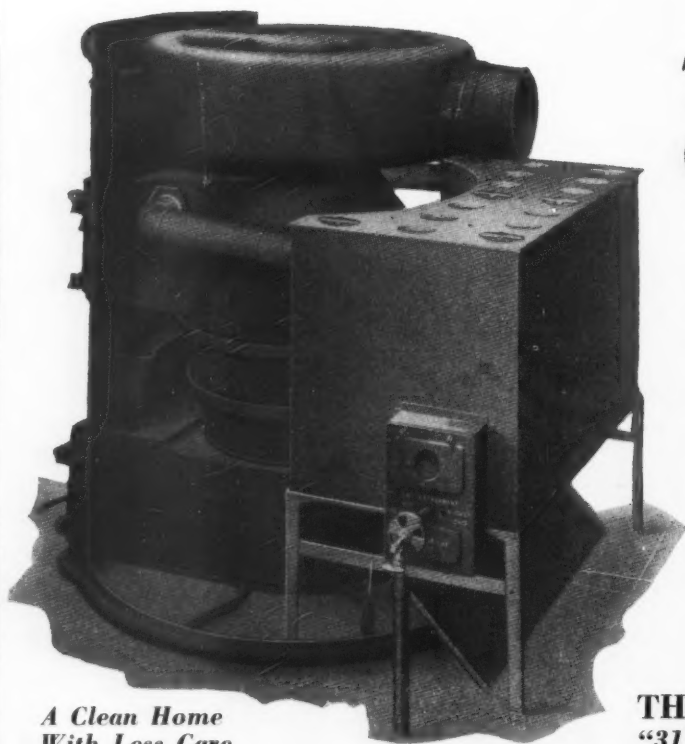
City.....State.....

Say you saw it in AMERICAN ARTISAN—Thank you!

Sell efficient GAS HEATING at a good profit
with

The MUNKEL GAS ATTACHMENT

(Fits Any Coal Furnace)



*A Clean Home
With Less Care*

EVERY furnace user is a live prospect—everybody wants this carefree heating convenience—every one will see the efficiency and economy features of the Munkel Gas Attachment.

The Munkel Gas Attachment heats both units when burning gas by conveying the products of combustion from the gas unit through the coal unit to the flue—long fire travel and increased radiating surface and the use of the furnace for burning paper, rubbish, etc.

You sell your *old* as well as *new* customers this *clean, convenient* form of heating with the Munkel Gas Attachment.

Go after this NEW business—Write today for full details and prices.

THE MUNKEL-RIPPEL HEATING CO.
"31 Years of Service" Columbus, Ohio

"Old Wine in New Bottles"

LONDON BOILER PLATE Quality Plus FURNACES



*Are Cold Riveted and Welded
Smoke, Gas and Fume Tight*

*Are Equipped with Either
Duplex Basket Dump,
Triangular or Draw-Center*

GRATES AND RADIATORS

FOR
SOFT OR HARD COAL,
COKE OR OIL

*"Feather Your Nest"—
Write Today for Proposition*

THE LONDON FURNACE CO.
LONDON, OHIO

THOS. W. PEARSON—Sales Manager

Say you saw it in AMERICAN ARTISAN—Thank you!

**CRYSTAL
BLUE FLAME
OIL BURNER**

The Oil Burner That Turns Oil to Gas—then Burns the Gas...

ATTRACTS CROWDS AT CHICAGO OIL BURNER SHOW

CRYSTAL'S famous **BLUE FLAME** is an oil-gas flame . . . produced by converting fuel oil to gas before combustion takes place . . . and then burns the gas with a clean, sootless, **BLUE FLAME**.

The **BLUE FLAME** is the flame of **COMPLETE** combustion . . . hence no smoke . . . no soot . . . no carbon

. . . no odor . . . no waste. And because burning a **BLUE** oil-gas **FLAME**, the number of parts essential to perfect performance and heating economy is reduced to a minimum.

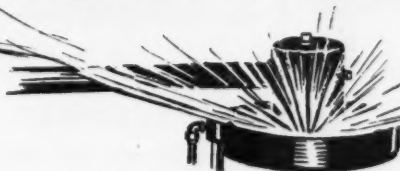
Crystal is quickly installed in any type furnace without alteration in or addition to furnace or flues.

Send for Attractive Dealer Plan

CRYSTAL OIL BURNER CORPORATION
1440 Broadway, New York City

Crystal BLUE FLAME Oil Burner

Listed and
Labeled by
Underwriters
Laboratories



Approved by
Board of
Standards
and Appeals,
New York City

THE PEER OF THEM ALL— THE NEW PEERLESS CAST FURNACE



PEEERLESS engineers, who have had many years of experience in designing and building high grade warm air furnaces, have put their all in the design of this new Peerless Cast Furnace.

Not only in design but in quality of material and workmanship it is truly a Peerless product.

*The details of its construction—
the outstanding features—will
prove mighty interesting—write
for descriptive literature today.*

THE PEERLESS FOUNDRY COMPANY

Bailey-Farrel Mfg. Co.,
Warehouse Distributors
at Pittsburgh, Pa.

INDIANAPOLIS, IND.

Warehouse,
Youngstown, Ohio

Mention AMERICAN ARTISAN in your reply—Thank you!



H&C FEDERAL

Quality Built
Furnace
Accessories

The same outstanding quality that always has been characteristic of both Federal and H. & C. products is found in the combined H. & C.-Federal line, which includes practically every furnace accessory required by the furnace trade.

The best of materials—finished workmanship—good design, and attractive prices make these products unusually good values.

See your jobber or write direct for catalog and prices.

Regulators —3 styles to choose from. Furnished in complete sets, one to a box, for each furnace—with any desired combination of pulleys, chain, hooks, etc.—or separately.

Pulleys —Smooth-running steel pulleys to meet every installation requirement.

Chain —All the leading styles and sizes, plain or rust-proofed.

Dampers —Sturdy, well made. Handle enters either side of disc. Made in 8", 9", 10", 12", 14" sizes.

No-Rivet Damper Clips and Tips —Made of heavy material. Punched with rivet holes, but can be fastened without rivets by means of prongs provided.

Chain Plates Drawband Lugs
Casing Hooks
E-Z Furnace Cleaners

Immediate shipment from warehouse stocks

**HART &
COOLEY
MFG. CO.**

*Successors to Federal
Mfg. Co.*

61 W. Kinzie St., Chicago
Factory at Holland, Mich.



*Write
for Catalog
and Prices*



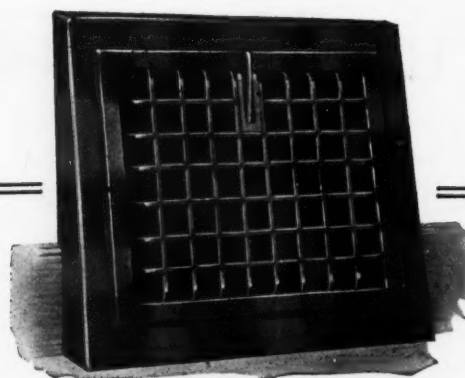
4 to 6 jobs a day—one man—powerful—light

FURNACE cleaning has revolutionized the furnace business for live owners of speedy Super Suction Cleaners.

There never was lack of cleaning in sight. Now they do it better—quicker—and of course their profits are multiplied. Shops busy all summer with replacements and overhauls. And new furnace prospects spotted and sold.

Our free PLAN BOOK shows the way to these easy profits. Ask for it today.

THE NATIONAL SUPER SERVICE CO.
1944 North 13th Street Toledo, Ohio



The AUERISTOCRAT

of all registers, combining air capacity, decorative and concealing features.

Designed to conform with the Standard Code so they fit all standard boxes.

Auer Patented mechanical features make it perfect in operation,—quick and easy to install.

Auer's Save Hours and Dollars
The AUER REGISTER CO.
Cleveland, Ohio

Say you saw it in AMERICAN ARTISAN—Thank you!

ULTRA QUALITY AND VALUE

Vernois

**FURNACES
CIRCULATORS
AND
GAS RANGES**

Buy with confidence ~ ~ Sell with pride

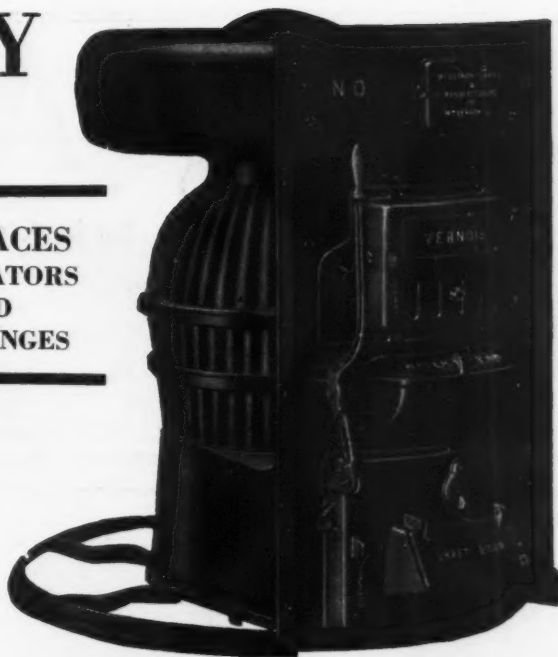
Vernois furnaces are designed to produce the greatest efficiency. They have large fire and ash doors which fit tightly. Equipped with either Ball Bearing Round Grates or Triangular Bar Grates.

The radiator is a large oval shape entirely free from sharp angles, seams and joints. No place for soot or dust to accumulate. Nothing to impede radiation or choke draft.

The same care is embodied in the entire construction of the Vernois. Ask for catalog giving details.

Vernois Circulators give greater heat from less fuel. They are handsome and of Vernois high quality throughout.

MT. VERNON FURNACE & MFG. CO.
MT. VERNON, ILL.



*Vernois
Cabinet Circulator*



*Vernois
Gas Range*

REMEMBER THIS-

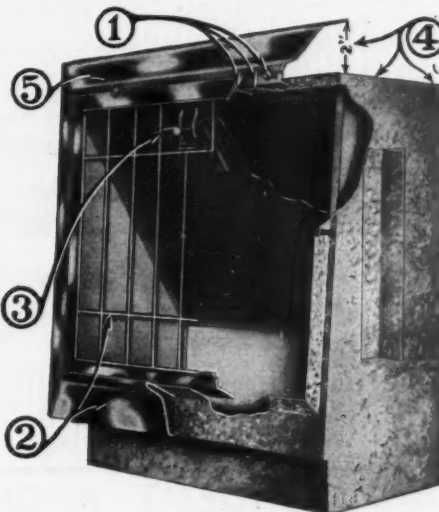
Whenever you hear streaked walls
mentioned it's your cue to mention

NO-STREAK REGISTERS

Many dealers make good profits just
by replacing old registers with
NO-STREAK and **OUT-O-WALL**
registers.

They permanently prevent the
walls from becoming streaked

ROCK ISLAND REGISTER CO.
ROCK ISLAND ILLINOIS



ROCK ISLAND REGISTER COMPANY,
Rock Island, Illinois.

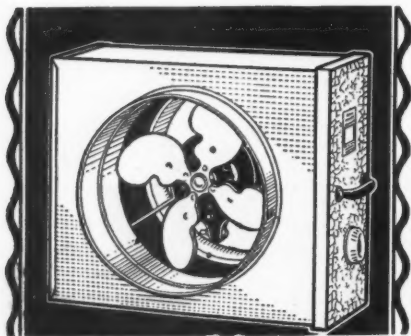
Send me your catalog and price list.

Name.....

Street and Number.....

Town..... State.....

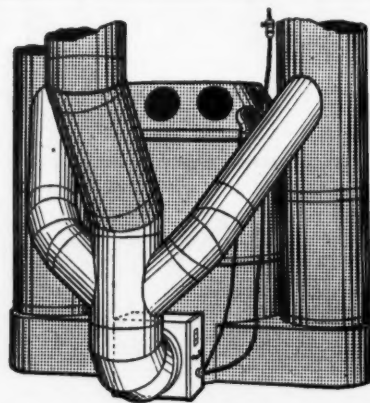
Say you saw it in *AMERICAN ARTISAN*—Thank you!



Write for full details and names of nearest jobber.

A-C *Thermostatically Controlled* Automatic HEAT BOOSTER

THE silent, efficient and economical furnace fan. The A-C is different and better and therefore popular with the trade. Let us tell you how the A-C increases sales and profits in warm air heating. Ask for our installation instructions. The A-C has no louvers—does not interfere with gravity operation, and is completely automatic.



A-C MANUFACTURING CO., 417 Sherman St., Pontiac, Ill.



An Emblem of Quality

The dealer who has never sold Torrid Zone steel furnaces has no conception of the many advantages this furnace line offers. To say you are familiar with Torrid Zone construction is not enough. There are, free engineering service, newspaper and dealer help advertising, financial aid, an unusual va-

riety of furnace sizes, quick deliveries made possible by large warehouse stocks, and a score of other Torrid Zone service features of vital interest to every furnace dealer. Why not investigate for yourself Torrid Zone possibilities. Write for complete information on the Torrid Zone line.

LENNOX FURNACE COMPANY, INC.

Marshalltown, Iowa Syracuse, N. Y. Toronto Winnipeg



GILT EDGE guaranteed FURNACES

FOR fifty-five years the name GiltEdge has meant high quality furnaces. Today more than ever before GiltEdge Furnaces lead as to quality and workmanship.

The GiltEdge agency will add extra prestige and profits to your business.

Write today for full details regarding the GiltEdge 1930 sales plan.

R. J. SCHWAB & SONS CO.

283 Clinton Street

Milwaukee, Wis.

WATERBURY SEAMLESS FURNACE REG. U.S. PAT. OFF. PIPE OR PIPELESS

The Waterman-Waterbury Co.

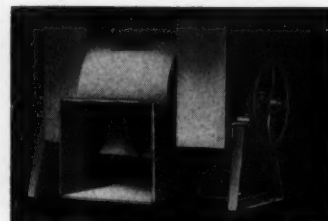
1122 Jackson Street N. E.

Minneapolis, Minn.

Furblo The Furnace Blower Everyone Recommends

MANUFACTURERS have adopted FURBLO as standard equipment — jobbers catalog FURBLO exclusively — dealers everywhere find FURBLO the one and only satisfactory solution to the problem of mechanical warm air heating.

FURBLO is not a fan—but a blower. Quiet, efficient, powerful, sturdy, dependable. Guaranteed to always produce on even the hardest job.



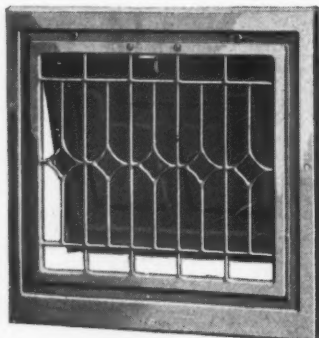
Lakeside Company

Dept. A4 Hermansville, Mich.

Makers of Lakeside Ventilating Equipment

Two sizes fit practically all installations. Send for complete information.

INDEPENDENT REGISTERS



VENTILATORS
GRILLES

Any Size
Any Finish

Our new catalogue will interest you. May we send you a copy?

INDEPENDENT REGISTER & MFG. CO.
3747 East 93rd Street ~ ~ Cleveland, Ohio

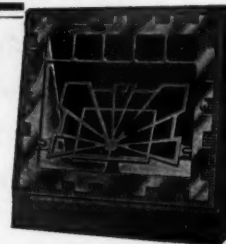
Our customers tell us that this register doesn't streak the walls and that it is quickly installed.

ALL THIS AND MORE,
AT NO GREATER
COST

SYMONDS REGISTER COMPANY

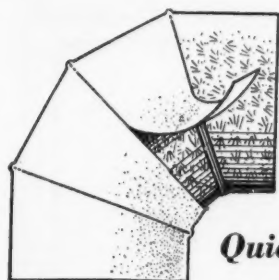
3117-23 Minnesota Ave.

St. Louis, Mo.



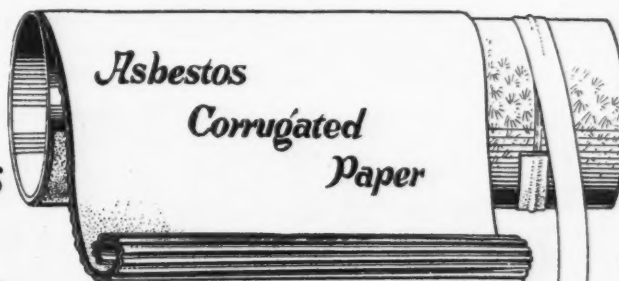
"It's different from all the rest"

Say you saw it in AMERICAN ARTISAN—Thank you!



Asbestos Elbow Segments

*Quickly applied—
neat and accurate*



Asbestos Corrugated Paper

Use these asbestos paper specialties for greater speed, neatness and profit

IT'S just as wasteful to cut your own asbestos segments and pipe joint tape as it is for your wife to knit your socks.

When your men are not busy have them put their time on productive work of some kind and when the shop is busy and you are putting in many furnace jobs they will appreciate these accurate fitting, quickly applied Sal-Mo specialties.

Sal-Mo Elbow Segments are made for 8, 9, 10 and 12 inch elbows or 45° angles.

Packed in cartons, always clean and ready for use.

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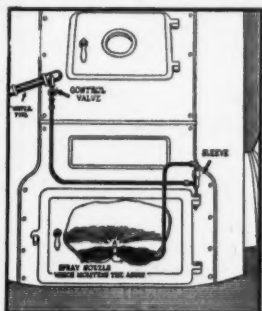


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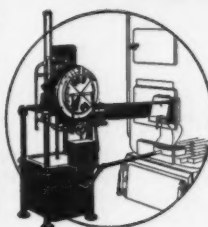
It prevents dust from spreading
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trick. High quality throughout—
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H. M. Sheer Co., 213 Hampshire St., Quincy, Illinois

Mention AMERICAN ARTISAN in your reply—Thank you!



Entered as second class matter, January 29, 1930, at the Post Office at Chicago, Ill., under act of March 3, 1879. Formerly entered on June 25, 1887, as American Artisan and Hardware Record.

Founded 1880

American Artisan

THE WARM AIR HEATING
AND SHEET METAL JOURNAL

Published EVERY OTHER SATURDAY—to Promote Better Warm Air Heating and Sheet Metal Work

Yearly Subscription
Price:

United States\$2.00
Canada\$3.00
Foreign\$4.00

PORTER-SPOFFORD-LANGTRY CORPORATION

139 North Clark Street, Chicago—Telephone Central 7670

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Frank G. Cambria, Eastern Representative

Vol. 99, No. 9

CHICAGO, APRIL 26, 1930

\$2.00 Per Year

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Mr. Leo H. Schroer



Mr. Ernie Walker

What We Think of Premier

BY MESSRS. LEO. H. SCHROER AND ERNIE WALKER
of the City Heating Co.,
New Premier Dealers in St. Paul, Minn.

CITY HEATING CO.,
EL-khurst 0923 676 University Ave.

April 12 '30

The Premier Warm Air Heater Co.

Dowagiac, Mich.

Gentlemen:

Regarding your telegram as to why we have taken the Premier Deluxe Agency.

We feel that we are doing ourselves due justice by taking on a line of Furnaces, which we believe is not only the highest quality Furnace but the only proven Furnace on the market today.

During the past seven years we have installed over a thousand Furnaces in St. Paul Minnesota, and our only wish is that they were all Premiers.

Truthfully we felt we were handling a good Furnace untill we gave the Premier Salesman Mr. F. A. Nelson an opportunity to show us the advantages in sales of the Premier Deluxe, and cannot see how anyone giving him the same chance could sell any other Furnace.

Thanking you for your cooperation.

We Remain,
Yours very truly

Ernie Walker
Leo H. Schroer

NOTE: Leo Schroer and Ernie Walker are representative of a new generation in the furnace business. They are the type of men who are always open to a sound means and method whereby their business may be increased. Four weeks ago they changed to Premier. In-

creased sales even within this short period of time have vindicated their good judgment.

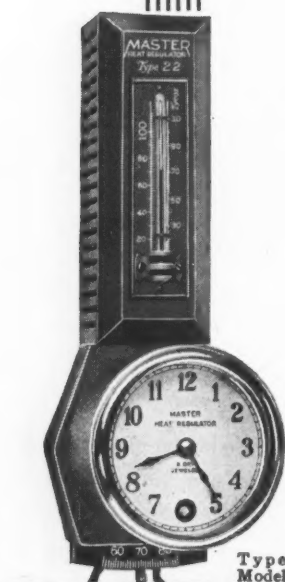
PREMIER of DOWAGIAC (Mich.)

Say you saw it in AMERICAN ARTISAN—Thank you!

ITS DEPENDABLE PERFORMANCE DOUBLES THE DEMAND

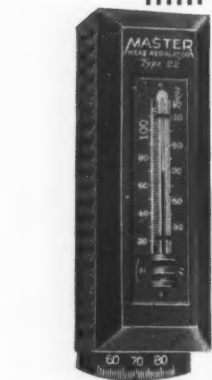
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TYPE 22



\$80

Type 22 Clock
Model with 8-Day
Jewelled Clock, \$80



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Type 22 Plain
Model, same as
above, without
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HERE is the secret for the remarkable sales success of the new Type 22 Master Heat Regulator. Selling for but little more than a hand-operated regulator, it offers complete, **FULL ELECTRIC** regulation—complete freedom from daily attention—many years of complete, trouble-free service.

Full-Electric Motor—no hand devices to forget—no attention required except once-a-year lubrication.

8-Day Jewelled Clock—accurate, reliable, no daily winding. Automatically shifts and trips the control lever night and morning without attention.

Closer Regulation with instant action upon temperature changes of one degree or less if desired.

Flawless Construction Throughout insures the utmost dependability. Made by the manufacturers of the **MASTER Gradual Operation** Heat Regulator.

*Write for complete information
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Geared Rotor
Type**
Dependable,
Quiet,
Powerful

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2362 University Avenue

St. Paul, Minn.



American Artisan

THE WARM AIR HEATING
AND SHEET METAL JOURNAL



Vol. 99

CHICAGO, APRIL 26, 1930

No. 9

We Believe in the Furnace Industry

AMERICAN ARTISAN irrevocably believes in and expects to exist in the field of warm air heating. We don't expect progress to be one smoothly climbing roadway leading to publishing success and financial contentment. We anticipate that our field will suffer its tribulations and encounter those problems which have beset every American industry. We expect our field to have to go through the fire of internal strife, external contempt and inside and outside indifference.

One of the most pessimistic utterances we have heard in years was given last week at the annual convention of the National Warm Air Heating Association. As expressed on the floor of the convention the statement was made that the speaker had as far back as five years ago looked into the future and decided that the furnace industry was going to drop out of America's industrial picture.

We don't believe that.

Just stop for a moment and consider what has been done in the last five years.

In 1925 we were saying "the pouches and feed and ash throats extend through the front."

In 1925 we were talking about "long, upright shaker handles which eliminated stooping and appeal to women."

In 1925 we were talking about "weight, deep joints, slotted fire pots, roomy ash pits."

In 1925 we were claiming "patented, underdraft check dampers."

In 1925 we were advertising "base rings and heavier steel."

In 1925 we were selling "extra large fire doors which accommodate the largest size shovel."

In 1925 we were talking about "extra large water pan, one piece ash pits, bell cup joints."

But why go on.

Yes, these were the things we were saying to the dealers in 1925. And these were just the things the dealers in turn were saying to the prospect.

The 1930 public and dealer take these things for granted. You can no more sell a furnace on such arguments today than you can fly. And those of us who are still doing it are the ones who are not making the sales.

What are the manufacturers talking about this year? They're telling about their merchandising plans, their co-operation between manufacturer and dealer, their engineering service, etc.

Why?

Because the industry is no longer a furnace industry. It is a warm air heating industry.

And right there we believe lies the meat of all this great proposition. We can't sell furnaces any longer and exist. We have to sell heat. We have to sell conditioned air. We have to sell humidified air. We have to sell comfort. We have to sell automatic heat. We have to sell appearance.

And these things were just peeping over the horizon in 1925.

We truthfully can't see how any sound thinking heating man, whether he be manufacturer, dealer, publisher, consumer, can view the progress made in the last five years and say that the warm air heating industry is fading out of the picture.

And taking the last five years as a background, how can we help but feel certain that the future will be a time of progress.

We are just entering the age of oil heat. More and more warm air, oil fired installations are being made. The combination opens up a field of automatic heating we have only scratched.

The gas heating industry is just hitting its stride. And use of gas in warm air heating plants has opened up an entirely new and unlimited field—the house costing from \$25,000 to \$1,000,000 or more.

Just think of what the appliance people have brought to our industry. We build a house. On one wall downstairs we place a little inconspicuous thermostat and that little accessory runs our heating plant better than a 24-hour-a-day furnace attendant.

We connect into our furnace an automatic humidifier, set to keep the relative humidity at the point where it is most comfortable. And through the long winter months the humidity of the air we are breathing never varies five per cent.

The coal men have taken the bull by the horns and are now co-operating with the furnace industry to insure clean furnaces, they have given us automatic coal

(Continued on page 46)

The Second Article On Cost Accounting

IN the preceding article, we gave a number of transactions pertaining to the opening of a set of books for a sheet metal shop. You were asked to preserve that issue of the Artisan for use in connection with this article. We now present, on ledger sheets, the transactions given an ask that you follow these through to get the idea of "posting" firmly planted in your mind. The entries were keyed with numbers, which key numbers ap-



Joseph G. Dingle, C. P. A.

pear on the following ledger accounts.

Now, to make the matter more interesting, let's take off a trial balance. Take a sheet of paper and rule it for two columns of figures. Head up your sheet like this:

Account's Name	Debit	Credit

From the illustrations, bring down your account names and balances; thus, from the account headed "Bank" write, under "Account Name" on your sheet the word

The first article of this series appeared in the April 12 issue. In that article Mr. Dingle defined the terms of cost accounting and showed how items for the journals and ledgers are sorted and entered. This article shows how the items appear on the sheets.

"Bank" and in the column headed "Debit," insert the balance shown on the ledger sheet—\$2,750.00. Follow this through the eight ledger accounts and then add, or foot, each column of your trial balance. They should each total \$4,350.00. To check your work, refer to the previous article and you will find near the close of the article a trial balance which should agree with yours. Having drawn off your own trial balance, you are more ready to analyze it.

With the exception of Rent, the transactions used thus far record the moving of value into physical assets. Your money and that of

SHEET NO.		CREDIT LIMIT		NAME <i>First National Bank</i>		ACCOUNT NO.	
RATING		BUSINESS		ADDRESS			
DATE	ITEMS	DEBIT	DATE	ITEMS	CREDIT	BALANCE	
<i>Jan 2</i>	<i>Capital (1)</i>	<i>1</i>	<i>Jan 2</i>	<i>Bank (2)</i>	<i>1</i>	<i>3000</i>	<i>2750.00</i>
			<i>15</i>	<i>Machinery</i>	<i>2</i>	<i>200.00</i>	

Your ledger entries rightly begin with the sheet showing your transactions with your bank. This sheet shows the entries from Table B of the last installment. The bank was debited with an item of \$3000.00. Two credit items then were entered—Rent, \$50.00, and Machinery, \$200.00. These subtracted from the original deposit leaves \$2750.00—your balance

SHEET NO.		CREDIT LIMIT		NAME <i>Capital Account</i>		ACCOUNT NO.	
RATING		BUSINESS		ADDRESS			
DATE	ITEMS	DEBIT	DATE	ITEMS	CREDIT	BALANCE	
<i>Jan 2</i>	<i>(1)</i>	<i>1</i>				<i>3000</i>	<i>3000</i>

Your Capital Account sheet carries as a credit item the \$3000.00 you deposited when you began business. You put the \$3000.00 in the bank—your disposition—and debited the Bank Account. You set the \$3000.00 aside as your capital. Your Capital Account, then, is the source of this fund and is therefore credited

SHEET NO.		RATING		CREDIT LIMIT		NAME <i>Rent</i>		ACCOUNT NO.	
BUSINESS						ADDRESS			
DATE	ITEMS	DEBIT	CREDIT	DATE	ITEMS	DEBIT	CREDIT	BALANCE	
Jan 2	(2)	\$50.00						\$50.00	

Your Rent sheet or account is opened with a debit of \$50.00. The \$50.00 was the amount you agreed to pay each month for your place of business. Each month as you draw your check for rent you will debit—for you are making a disposition—\$50.00 on the Rent ledger. Probably the only way you will make a credit on this sheet is to rent part of your store or shop to another

your creditors is invested in Cash, Machinery and Supplies. If I have succeeded in my effort, you now understand that business is merely a multitude of rapid changes from form to form—place to place—account to account, and bookkeeping is the art of keeping a record of these changes to enable the business man to know just where his money is.

You may wonder at my using the word money in the sentence above. You may say that expense is expense and when you pay rent money

SHEET NO.		RATING		CREDIT LIMIT		NAME <i>Machinery</i>		ACCOUNT NO.	
BUSINESS						ADDRESS			
DATE	ITEMS	DEBIT	CREDIT	DATE	ITEMS	DEBIT	CREDIT	BALANCE	
Jan 15	(3) 2	\$1000.00						\$1000.00	

When you bought your machinery on time you made it necessary to charge off the transaction on three sheets. First your machinery account is debited with an entry for the total cost of the purchase—\$1000.00. This item is debited since by our standby rule we debit the disposition—and we disposed of \$1000.00 by buying your machinery

SHEET NO.		RATING		CREDIT LIMIT		NAME <i>Materials</i>		ACCOUNT NO.	
BUSINESS						ADDRESS			
DATE	ITEMS	DEBIT	CREDIT	DATE	ITEMS	DEBIT	CREDIT	BALANCE	
Jan 14	(1) 2	\$50.00						\$50.00	

Sheet No. 5 is headed Materials—it will become one of the busiest ledgers in our system. Over its pages will march the financial record of your purchases of materials. When business is good many items will be put down, but when business is slack—but why go into that now. At any rate our first is a debit of \$50.00, the amount our first material cost

over to your landlord it is gone so far as you are concerned. True, the actual cash has left your hands, but when we charge it to rent, we do so first because we want to show where it went—to record its passage from the bank to Rent.

Second: We have paid, among other expenses, rent, which is a part of our overhead and must be included in our prices to our customers. Our selling prices are made up of four parts: Material—Labor—Overhead — Profit.

SHEET NO.		RATING		CREDIT LIMIT		NAME <i>Notes Payable</i>		ACCOUNT NO.	
BUSINESS						ADDRESS			
DATE	ITEMS	DEBIT	CREDIT	DATE	ITEMS	DEBIT	CREDIT	BALANCE	
Jan 15	(2) 2		\$800.00					\$800.00	

Notes Payable, we hope, will be one of the least used ledgers in your system. If its entries are few and far between an accountant will know that you are buying for cash or at least meeting your bills with money and not with notes. Your first entry, however, is a credit of \$800.00, in other words, a source

Unless we keep a good record of our expenses how can we know how much to add to our material and labor costs for overhead? This is just as important as knowing that we drew the money out of the bank. There are then two reasons for keeping accurate records:

First: To enable us to know where our money is; and

Second: The relation of these accounts to each other in order that we can better carry on the business.

Without accurate expense accounts, we must guess at our overhead. With accurate records, we *know* our sales are so many thousand dollars and we *know* our overhead is so many hundred dollars. With these two *known* figures we can easily determine the percentage of overhead to sales.

Bookkeeping is merely the keeping, in orderly fashion, of a written record of the transactions of the business. The principal requirements of a good set of books are well designed journals—permitting

Forced Warm Air

THE IDEAL FACTORY HEATING SYSTEM

By J. C. MILES

Warm Air Furnace Fan Company

FORCED warm air heating for factories is more and more coming into its own, for warm air heat has been found ideal for heating spaces enclosing large open areas of floor on which various manual operations are carried on. The result of this trend has been more work for the sheet metal and warm air furnace man. And the best part of the situation is that the jobs are of such a size that the profits are proportional to the amount of money being spent in heating.

While the huge factory systems are still most frequently erected by heating engineering firms there remains a vast field for the smaller contractor working with those man-

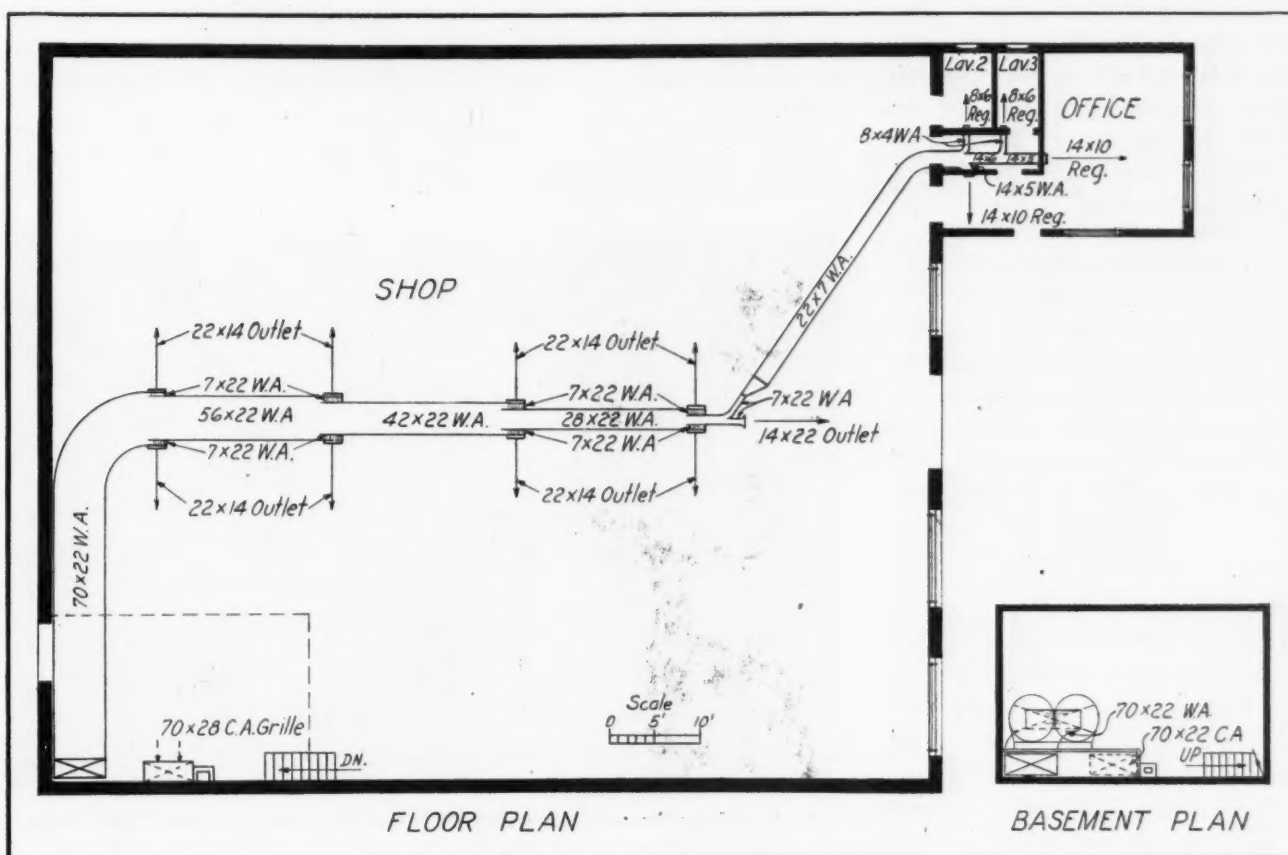
ufacturing plants where reconstruction of heating facilities or the installation of a system costing a few hundred or a few thousand dollars is being projected every day.

A good illustration of a system of this nature is the one recently completed for the Toledo Paper Box Company of Toledo. The contractor for the work was Joe Dersher of Toledo. Joe's specialty is roofing and sheet metal work, but he also does furnace work and is now beginning to install factory heating systems.

Previously all of the heating work Joe did was done as a subcontractor. This job inaugurates his entrance into the field as a full fledged contractor of heating.

The photographs and plan drawing which accompany this article show just what the job looks like and how it was laid out.

The principal of this plan is what is known as the overhead system, wherein the heating ducts are run horizontally along the ceiling, with the necessary branches coming off the main duct. These branches are directed at a 45 degree angle toward the floor so that the heat will travel down to the floor from the outlet velocity of the opening where the fan is running. The stack effect, due to the height of the duct, will also allow for some gravity flow, which will hold the temperature during the low load period and at the same time protect the fur-





The main duct turns at a 90° angle from the furnace and is carried down the center of the room. Distributer heads are taken off every few feet. In addition to the heads shown in the plan, three distributor leads were run out to carry warmed air over the machines. The far end round pipe supplies the office

nance from burning out when the fan is off or against abuse or neglect.

When the job was laid out the heat loss was estimated by the use of the heat loss coefficients (constant k) as adopted by the American Society of Heating and Ventilating Engineers. It was found that the total B.t.u. loss was 384,400 B.t.u. To this was added 10 per cent as a factor of safety from which the furnace size was arrived at by the formula:

$$\text{Grate Area} = \frac{\text{B.t.u.}}{\text{CR} \times \text{CV} \times \text{E} \times \text{E}_2}$$

The "Combustion Rate" was figured at 8 pounds per square foot, the "Calorific Value" estimated at 12,000 B.t.u. per pound, "E" (Bounot Efficiency) 70 per cent, and "E₂" (register efficiency) 90 per cent. Hence the calculation was

$$\frac{422,000}{8 \times 12,000 \times .70 \times .90} = 7.0$$

(approximately).

Two furnaces of 3.5 square feet of grate area each were used. This would mean that each furnace would have a capacity of a little more than 211,000 B.t.u. connected together under one common (twin) hood.

The air volume was based upon the B.t.u. loss and the temperature rise in the air—thus

$$\text{CFH} = \frac{\text{B.t.u.} \times 55}{\text{TR}}$$

The temperature rise decided upon was 80 degrees F. Then the

$$\text{CFH} = \frac{422,000 \times 55}{80} = 290,000$$

or $\frac{290,000}{60} = 4,800$ CFM. Two fans having a capacity of 2,500 CFM

each were used, with one fan attached to each furnace.

The pipe area was found by dividing the volume per minute by the velocity in the pipe. Thus—

$$\text{Pipe Area} = \frac{\text{Volume}}{\text{Velocity}} = \text{Square}$$

feet. Hence the Pipe Area = $\frac{5000}{500}$

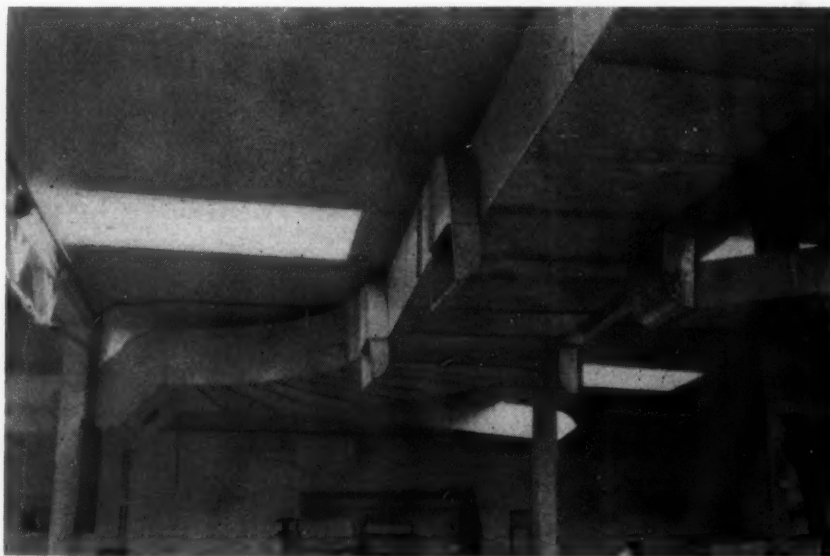
= 10 square feet. Pipe area in inches = $10 \times 144 = 1440$. The pipe size is found by dividing the total area in inches by the depth of the pipe, which in this case was 22 inches. Hence the Main Trunk

$$\text{Line Dimensions} = \frac{1440}{22} = 70 \times 22 \text{ inches.}$$

The heat loss for the shop called for a pipe dimension of 63×22 inches and in view of this loss and being in one large room, the outlets were divided into 9 openings distributed as shown.

It will be noted that on one side of the trunk line the outlets are $\frac{1}{3}$ larger than are the others. This was done by reason of the fact that one side of the building is occupied by presses and workmen and the other side is used for storage. Because of this the greater amount of heat is delivered to the working part of the building.

The 22×7 -inch duct leading to the office and laboratories is divided into two 8×4 -inch lines to



A view along the main duct looking toward the furnace room. This shows the 45° deflector heads and the duct reductions at the head take-offs



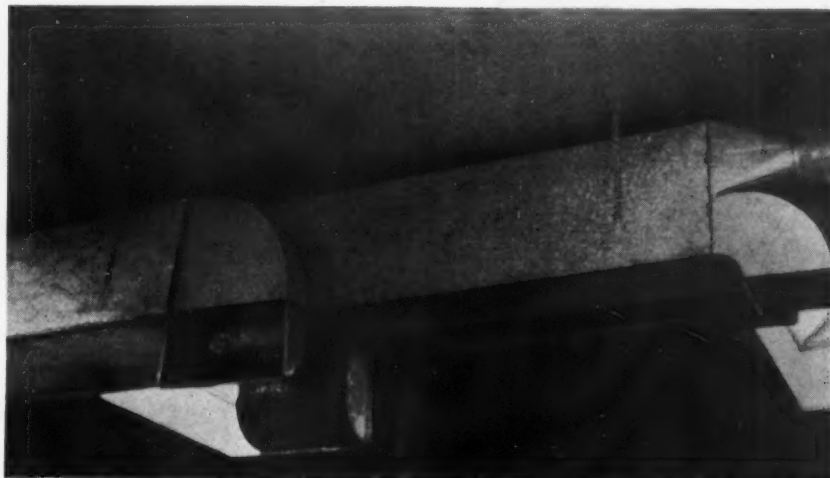
A view of the exterior of the one-story factory building

the lavatories and two 14 x 5-inch lines to the office.

The fans on this job are two No. 18-C Miles furnace fans having a combined capacity of 5,000 CFM against the resistance. Each fan has a $\frac{1}{4}$ hp. simple phase 60 cy. condenser type motor running at 860 rpm.

Each fan frame has approximately 1,000 square inches of free area for gravity circulation, which is somewhat over capacity.

A significant point to note here is that the trunk line has an area of 1,540 square inches and by allowing 113 B.t.u. per square inch



A closeup of a head and the reduced duct. Note the elbow and deflector. The square to round transition is the beginning of the office pipe run

"The Philosophy of the Sap"

"I can beat any estimate, because I have no Overhead."

"When I have nothing to do, I go fishing; it don't cost me nothing and I can always borrow or get credit to start again."

"Maybe sometime I can't do that, they seem to be getting stingy these days, but why worry now, something will always turn up."

"Join the Association? Not me. Why should I, I can get all I want to know without paying; just by asking; they're easy."

"Business is not so good now and I can't cut down no more, unless I starve; guess maybe I'll go on a diet, I'm too fat anyway."

"Jim Smith says he knows his Overhead and that I ought to. It keeps him worried if he don't get it back, so I guess I'll pass it up 'cause I don't want any more worry—I got enough."

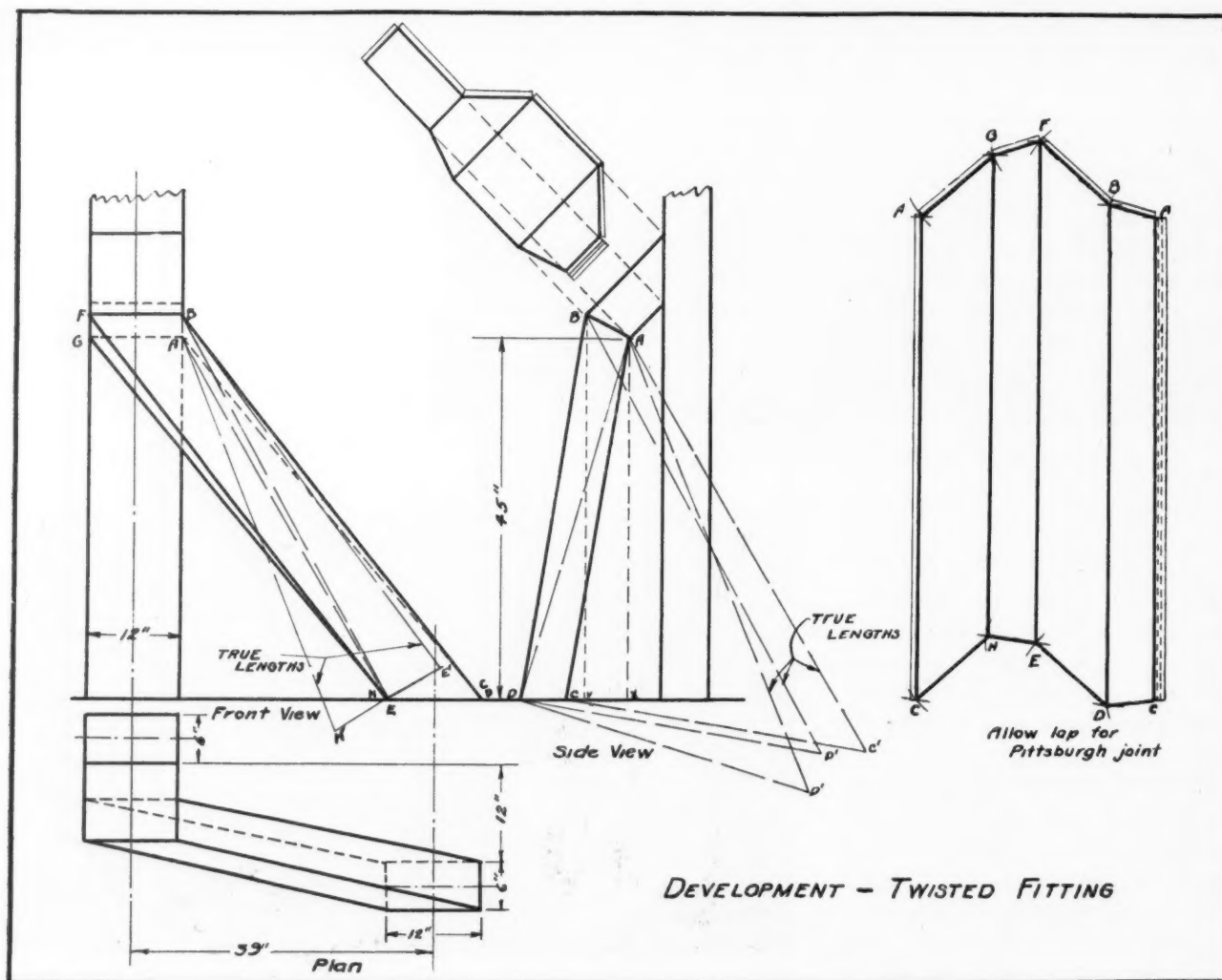
"Do I figure my bills right?" "Sure." "After I get what I paid for the stuff all else is 'gelt'—it don't cost me nothin' to do the job myself."

"Put on a tin roof?" "Shucks, it takes too long." "Use copper for spouts?" "Nope, not me, they last too long." "If all of us put up copper and put in new heaters, we would soon be out of business." "Patch them up, it makes business."

"Collections are always good with me." "I collect before and while I'm doing the job."

"Ever get stuck?" "Once, but I hammered the spout up into a lot of dents when he didn't pay me, so I got even with him."

"Keep books?" "Naw, that costs money." "So long, guess I'll have to go see a lady who wrote me last week, she wants something done. Hope she got someone else, I don't feel like workin' today." "You haven't got two bits you don't want." "No, it isn't charity, maybe I'll be rich some day and anyway, it'll give you something to charge to overhead in your fancy books."



Development of Twisted Fitting

The drawing shows a particular problem submitted for development.

It is not often that it is desired to use a fitting of this kind, due to the fact that the free opening or area of the pipe is restricted. If the installation is such that it is required to have full pipe capacity, this can be accomplished by the use of additional sections. With this particular problem, it was understood that the fittings were desired as shown, regardless of the fact that the area of cross-section of the pipe is restricted.

The drawing is laid out to scale, showing the front, side and plan views.

Generally one of the shortest sides is used for the seam, so we

E. W. Robinson, 95 Bank Street, Bridgeton, N. J., sent us a rough layout of a problem he had run into. He needed a layout for a twisted 6 by 12 chute which was to run from a conveyor to a mill. W. R. Haines, Marshalltown, Iowa, has worked out the pattern which we publish here.

start with line AC as shown on side view. The first step is to determine the true length of line AC. At point C on side view we draw a construction line at right angles to

line AC. On this line we step off a distance of 39" to scale, because that is the amount of offset; or in other words, 39" represents the base of the triangle. This locates point C' and line AC' is then the true length of line AC. Line AC', which is the true length of line AC, is then laid out to start the development.

Line CD as shown on the side view is shown as the true length, so using this length as a radius, an arc is circumscribed from point C on the development. Then, to definitely locate point D, the true length between points A and D must be determined. Line AC is drawn as shown on side view. The true length of this line is determined in the same manner as line

AC. The construction lines are shown, and line AD' is the true length of line AD. Then, from point A, an arc is circumscribed equal to AD'. Where this arc intersects with the arc drawn from point C, point D is located.

Point B is next located. The line AB is shown as the true length on the side view. From point A, circumscribe an arc equal to this distance. The next step is to determine the true length of line BD. This is found in the same manner as described for AC and AD. The construction lines are shown on the side view. Using the true length of BD, which is BD', circumscribe an arc from point D. The intersection of the two arcs, then locate point B.

Point E is next located, which gives line DE. The true length of line DE is shown as drawn on the front view. Using this length as a radius, circumscribe an arc from point D. Then to definitely locate point E, the true length between points B and E must be determined. This length is determined from the front view. The line BE is drawn in as shown by the construction line. Another construction line is drawn at right angles to line BE at point E, forming the base of the triangle. From point E, we lay out a distance equal to Dy as shown on the side view, which locates point E'. Then line BE' is the true length of line BE. From point B on the development, we strike an arc using the distance BE' as the radius. The intersection of this arc with the arc from point D gives point E.

The next point to locate is point F. The line BF is shown as the true length on the front view. From point B strike an arc using distance BF as a radius. To definitely locate point F, an arc is circumscribed from point E, using the true length of line EF as the radius. The true length of line EF is the same as the true length of line BD. The intersection of the two arcs then locates point F and line EF.

The next point to locate is point

G. Line FG is the same length as line AB. From point F an arc is circumscribed, using distance FG as a radius. The distance between point E and G is the same as the true length between A and D. Then use this distance as a radius and strike an arc from point E. The intersection of the two arcs definitely locates point G. Line GH is the same length as line AC and line EH is the same length as line AD. By striking these arcs from points G and E, we locate point H.

The next point to locate is point A or line GA. The true length of line GA is shown on the front view, and this is the same as BF. From point G, strike an arc using length GA as a radius. To definitely locate point A, we must strike an arc from point H equal to the true length between points A and H. The true length of line AH is determined by drawing line AH and

at right angles to this line through point H, draw another construction line. On this line lay off a distance equal to Cx taken from side view. This gives point H' and the true length of line AH is AH'. The intersection of the two arcs taken from point H with AH' as a radius and through point G with GA as a radius locates point A.

The last step is to locate point C. Line AC is equal to line AC' and line HC is equal to its true length from the front view. By circumscribing arcs from points A and H, using these distances as radii respectively, point C is located.

The short fitting is shown developed at the top of the side view, as this is a convenient place to make the layout. This layout is simple, and the procedure can be readily seen. The various points were projected and the distance stepped off.

Advertising Furnaces Via Radio At 6:30 in the Morning

THE fact that furnaces can be successfully advertised by radio was proved recently by the Forest City-Walworth Run Foundries Company, makers of Niagara and Monarch furnaces, when they conducted a campaign over WTAM. Much of the credit for the success of the campaign was due to the method in which interest was built up by teaser announcements and to the cleverness of Gene and Glenn, Jake and Lena.

The hour 6:30 to 7:30 each morning is the hour that the multitudes turn their heads more directly to their furnace and furnace problems. For that reason, the program was timely, right to the minute.

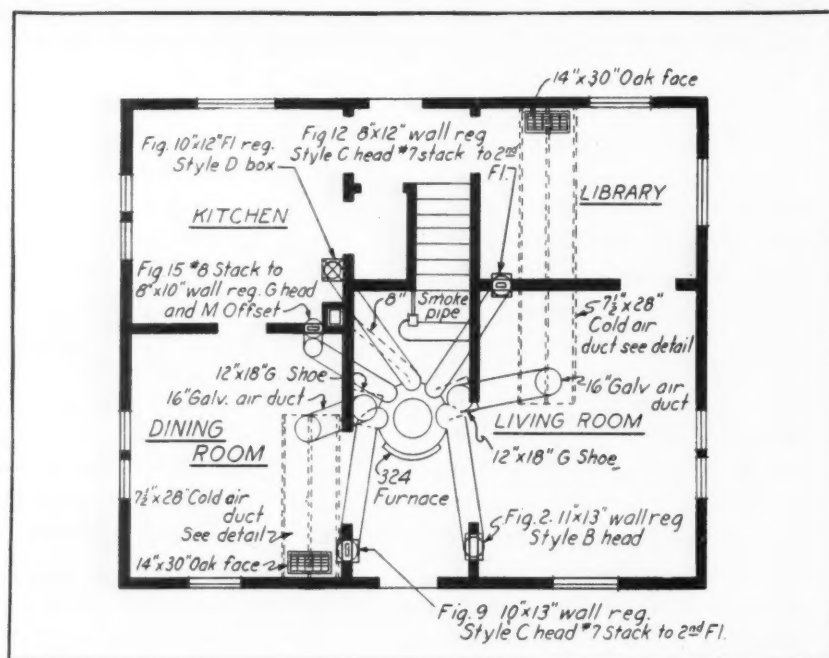
First, a complete furnace ash-pit with grates was erected before the microphone. The opening of the program each morning found Jake and Lena and Gene and Glenn still in bed and the alarm clock in

action broke the silence. After everyone was awake and accounted for, Lena proceeded to prepare breakfast while Jake fixed the furnace. He would give the grates a vigorous shaking. So natural was the sound carried into the homes of thousands of listeners, that many of them wrote the company saying it sounded like it was right in their own basement.

However, during the first few programs, no reference was made to trade name. Instead Jake had all kinds of trouble; he always got so dirty and could never get things warmed up. The picture of a poor furnace was painted as black as it could be.

Then Jake and Lena did away with the old furnace and installed a new Niagara. Many letters in reference to the early morning escapades of Jake and Lena and

(Continued on page 46)



This Is the Installation Which Has the Floor Drafts

The floor plan shows the warm air runs from the furnace to the registers. Also the cold air returns. The worst draft is across the hall and the doors to the living and dining rooms.

Why the drafts?

You Fellows Certainly Did FIX THAT HEATING PROBLEM!

IN THE last issue of the ARTISAN we published a letter from one of our readers who had been called in to fix a furnace installation which was giving all kinds of trouble.

The main trouble was that there was a strong draft across the floor. In presenting the problem we quoted the reader as follows:

"The house is new. It is a ready cut house, but seemingly is tight and without cracks or spaces where air movement can begin. Doors and windows fit as tightly as usually found in a wood house.

"Our observations seem to indicate that the real cause of the air movement is in the heating system. There seems to be a decided movement of the cold air going to the furnace and this is especially noticeable around the doorway between the living room and the hall. There is also movement in other rooms of the first floor. So far we have not had these drafts in the second floor."

The owner of the house also says that he believes the heating plant

consumes at least two tons of fuel a season more than it should. The furnace has a 24-inch firepot and is of standard make. Now we all know that two tons of coal a season is hardly worth arguing about. Any fairly poor fireman could easily waste that amount of fuel without even having to get up a half hour later. But just for the sake of argument you might also give any ideas on how a different layout for the system could save fuel.

In connection with the information given us, we showed a plan of the house and the furnace, with the warm and cold air leads and sizes indicated.

We invited solutions and we certainly got them.

We are not able to publish all of them in this issue, but here goes for the first ones.

One of the most interesting replies we had was from E. Kunold, 819 Superior Street, Aurora, Illinois. And right along with his letter Mr. Kunold sent us an excellent sketch with the layout as he would

install the job attached.

We are reproducing his layout herewith.

His solution goes as follows:

"In the March 29th issue of the AMERICAN ARTISAN you had a floor plan of a house that was giving a lot of trouble with cold air drafts across the floor, mainly in the hall and the doors between the dining room, living room and hall.

"I am sending in a plan which shows how I think the job should be to heat best and use the least amount of fuel.

"I think that placing a cold air return in each room on the main floor and especially in the hall at the foot of the stairs will make the heating plant work much better. I believe that side wall cold air registers can be used in this plan. The thing to watch in that case would be to see that the registers are plenty large enough.

"By placing the cold air returns at the side walls, the cold air returns would be shortened considerably. Also with side wall openings, five

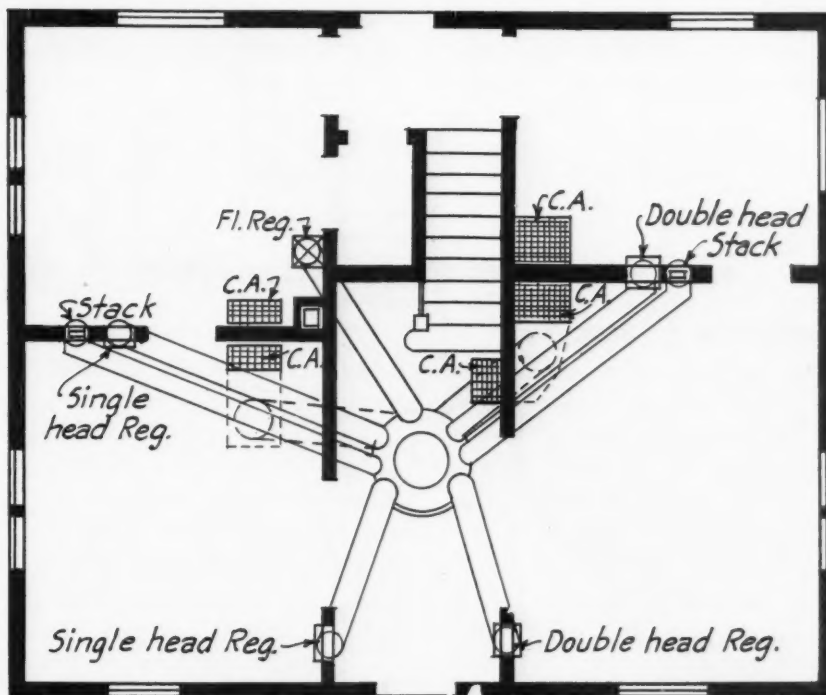
registers, instead of two, can be used and a much more efficient system will result.

"I don't believe in making the cold air runs in the jobs I install any longer than necessary. The same care should be used in keeping the cold air runs short as we use in keeping the warm air leads short. In this layout the cold air has to travel a long distance across the floor before it finds a register. This makes drafts along the floor.

"The reason the residents do not notice cold air drafts along the floors of the second floor is because the hall is so much larger than the cold air intakes that drafts can't develop. Placing a cold air register in the lower hall at the foot of the stairs directly in front of or to the left side of the stairs, will prevent the cold air which is coming down the stairs from sweeping across the floor of the hall and into the cold air register in the corner of the dining room or living room.

"Also, the warm air register should be moved back to the inside wall of the living room where it will be close above the furnace and away from the front door and the hall."

And right on the heels of this came a letter from a reader who



This is Kunold's altered plan. The striking difference is the long warm air runs. Notice, however, that these are admirably balanced. The cold airs, too, are plentiful

signs himself "Salesman." He did not give his name but we know he lives in Lockport, N. Y. Uncle Sam says so. He writes:

"Referring to article, 'This House Has Floor Drafts,' in issue of March 29th:

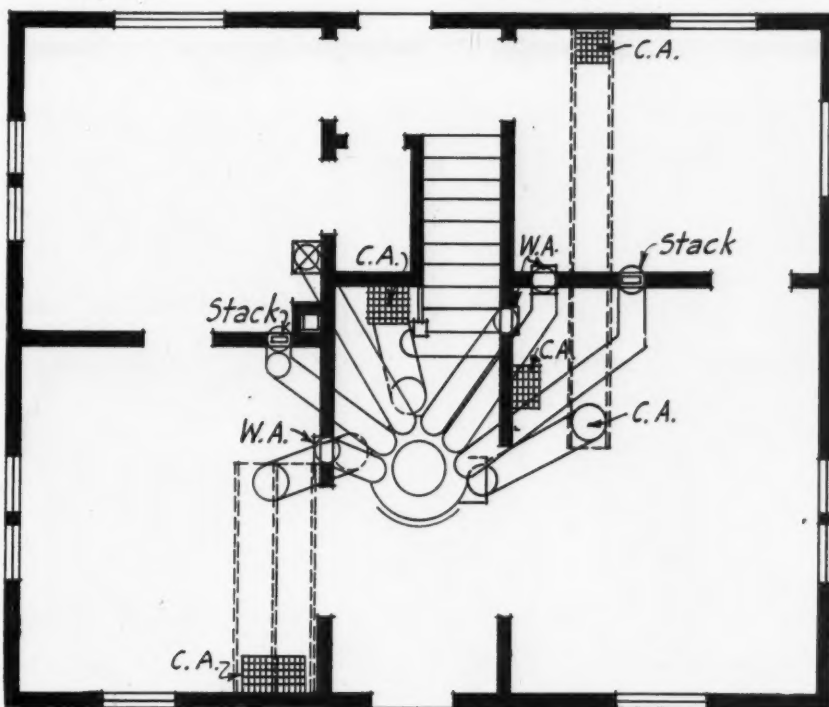
"It is hard to give accurate rea-

son, as dimensions, construction, prevailing winds, grate area of the furnace are not given and layout cannot be checked.

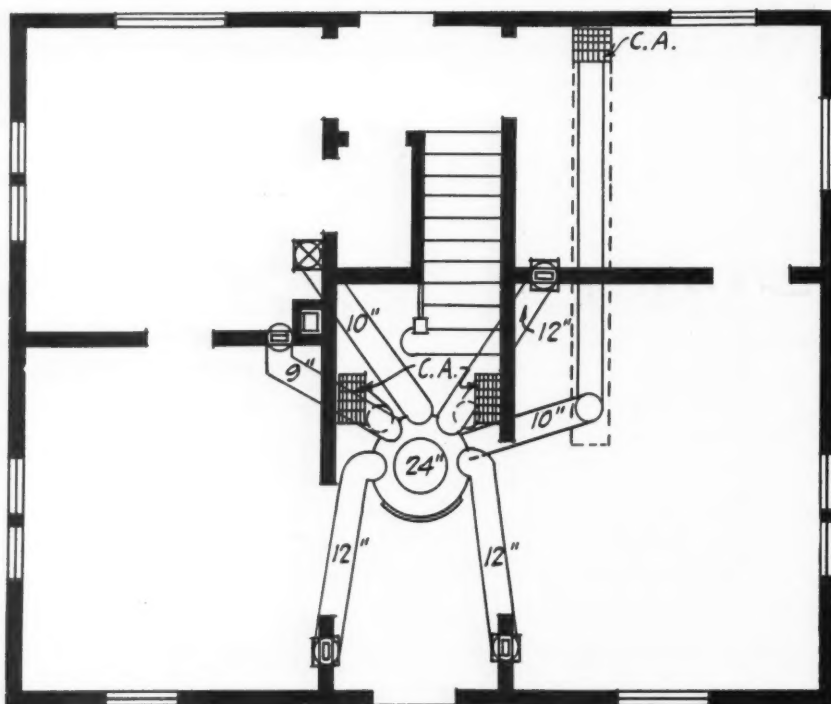
"The probable cause is poor circulation caused by inadequate cold air supply. The friction in both cold air lines run on the ceiling between the joist is nearly enough to stop all circulation.

"One cold air shaft should be taken from the hall to take care of air from the second floor. One cold air shaft should be taken from the living room on inside wall near the furnace, another from the dining room. I know that it is the practice to run cold airs to outside walls and use long pipes to get air back to the heater. This is done to avoid floor drafts. If the job is properly laid out, the temperature at the floor will be such that no floor drafts will be noticed. I claim that cold air should be dropped into the back of the heat as straight and as short as possible.

"The registers to the living room and the dining room on this job are poorly located. Both should be on opposite sides of the openings and near the furnace; separate runs to the second floor.



This is the altered plan of the reader who signs himself "Salesman." Of course all the warm airs would not be taken off one side of the bonnet, that's our drafting. That cold air face at the foot of the stairs seems good



"Just an Installer" works out his system with a minimum number of basement leads. This plan takes two cold air leads from the hall and one from the rear of the house. All the leads are large

"In regard to the coal consumption, if the B.t.u. losses are known, together with the heat value of the coal, the efficiency of the heater and the number of degree days in the place the heater is located, the coal consumption can be checked to within three per cent."

Some of the boys who answered were certainly short and snappy about the job. For example, Dewitt Van Evera solved the problem in one sentence. He says:

"Move cold air face in dining room out from corner; same about 65 per cent efficient where is now located; other details waived."

But there evidently is a decided difference of opinion as to the seriousness of the problem, especially if we can take the length of the letters and the details given as any means of judging.

Here's a reply from a reader who signs himself, "Just an Installer." His changes are shown on the accompanying drawing, while the suggestions he makes are as follows:

"The house is short of warm air, short of cold air, poor location of cold air, poor construction of cold air between joists, probably no decline.

"If plan is $\frac{1}{8}$ scale, it should have at least 10 inches to kitchen or 78 square inches; 12 inches to library and second floor run, or 113 square inches; 12 inches to dining room and second floor run, or 113 square inches; 12 inches to living room, or 113 square inches; 9 inches to second floor stack, figure 15

inches, or 63 square inches; a total of 480 square inches.

"If opening between dining room and hall and living room and hall are cased or plastered, no doors, one 24-inch cold air shaft from hall as shown with one or two faces, one 10-inch cold air shaft from library, round pipe starting between joists with at least $\frac{3}{4}$ -inch decline to running foot.

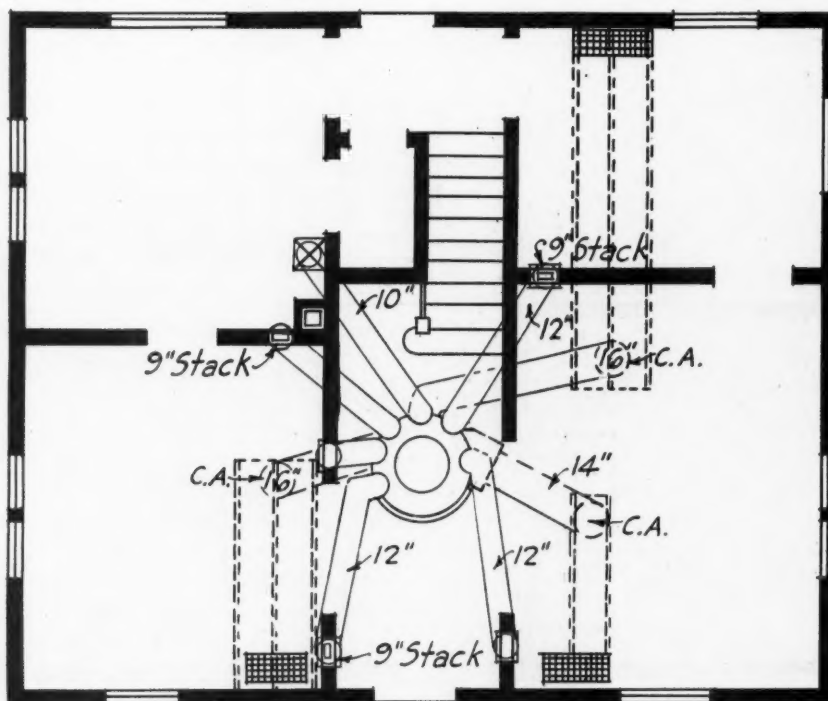
"Location of furnace very good. If three bedrooms and bath, each should have stack. No warm air in hall, but dining and living room warm air stack to be large enough to heat bathroom, first and second floor hall, providing no doors are between dining room and hall and living room and hall. Because of lack of dimensions, will not say my pipe sizes are O. K. Average 24-inch firepot furnace O. K.

"Have heated homes of almost same plan with this layout, having no unpleasant results. In my opinion, location of cold air stack and construction of cold air stack most important part of installation. Have experimented a lot.

"Let's have more of these trouble jobs."

And then there is a solution from J. M. Pratt of Alexandria, Indiana.

(Continued on page 46)



J. M. Pratt rather favors double heads. He achieves a well balanced system of runs for both the warm and cold air sides of the layout

National Warm Air Heating Association Reports Progress Made During Last Year

THE 1930 annual convention of the National Warm Air Heating Association, held April 15 and 16 in Detroit, probably reflected as sharp a contrast in business thought as has been experienced at any meeting of the Association.

The difference of opinion regarding business conditions was in marked contrast with past conventions when the members felt that conditions were either good or were bad. This feeling of hesitancy was also evident throughout the little knots of members gathered in rooms and lobbies.

In spite of this handicap, the meeting taken as a whole was successful. The speakers were well selected and handled their subjects in a presentable manner. The subjects were timely and fitted right in with the spirit of the day. As one member said, you heard and saw just

what you looked for; if you wanted gloom you could find it, if you wanted optimism it was just as plentiful.

While the registration was somewhat below that of last year, there was a very representative gathering on hand the first morning. Promptly at 10 o'clock President Triggs called the meeting to order. The first thing on the program was an address of welcome and the response by the president. Following this President Triggs delivered his address to the convention and the Association.

The gist of the president's message was that the warm air furnace industry has been and is making progress. There probably isn't a member of the Association better qualified to give just the right perspective to this progress than President Triggs, for our president has literally and truthfully grown up

with the warm air heating industry.

Way back in the days when houses were heated with Ben Franklin stoves, or in the more luxurious home a huge base burner, Jim Triggs and his brother had the job most boys of the time dreaded most—that of filling the family wood box. "In those days," said the president, "our father used to buy wood by the cord, but being a thrifty individual he bought it in lengths and it was our job to saw it to such a size that it would go in the stove. Well, we had to cut each stick twice and it was our one ambition to find some means or some burner that would be large enough to take that stick of wood after being cut once. You see, we were looking for a means of reducing labor. Heating was only secondary.

"Then one day I was reading in a catalogue about a furnace which was put in the basement and which



The warm air furnace industry was well represented at the annual banquet. If you don't recognize some of the members it may be because everyone had to remove his glasses. The speaker's table was lined with notables.

heated the house from one fire. But the greatest advantage from my point of view was that this contraption took a 4-foot length of wood. There, said I to my brother, is the answer to our wood sawing problem.

"We set out to sell our father on the furnace idea. He said go ahead, and right there Jim Triggs launched into the furnace industry. We bought an old boiler, laid it on its side and made a new end so that the fire door was in the end and not in one side and placed the boiler in the basement. Around the old boiler we built a brick casing. From the top we took warm air leads made of tin pipe from our father's store. These we carried through the floor and into the walls and out of the side walls of the rooms. In the bottom of the brick casing we left holes so that the cold air could enter the space between the boiler and the brick wall. Here it would be heated, rise through the pipes and enter the rooms.

"The thing worked admirably. It even pleased our father, and for once really kept the house warm for our mother. But as you can easily imagine, it had one serious fault. Whenever we took out the ashes, or swept the dirt floor of the basement, our mother had to take out the same dirt from the first floor. The cat holes worked too well.

"Then one day I was reading another catalogue and the maker of a furnace illustrated said that taking the cold air from the basement was all wrong, and that the air should come from the outside. This seemed to me to be logical, so we tore down the casing, bricked up the cat holes, built a cold air chute to the outside and once more set the furnace going. This relieved the dirt trouble, but caused a falling off in the efficiency and economy of the plant.

"But it was only a little while after this that I ran across the real solution of the problem. 'The air should be taken from inside the house itself,' said this authority, 'and should be carried out of the

Not one man in 50,000 can afford all the things he would like to buy. Your furnace dollar is in direct competition with radio, auto, theatre and a long list of other products being sold aggressively. You have to lick this competition before you even get a chance at your competitors' competition.

rooms through ducts, returned to the heating chamber, heated and brought back to the rooms.' That was the beginning of Jim Triggs' modern furnace.

"We tore out the walls, built cold air returns through the walls, increased the number of warm air leads and thus heated more rooms, put in the grills and lo and behold, we had a heating plant that was the envy and admiration of the whole countryside.

"With this I began my existence in the industry. I have seen it go through the stage of being a side line with some foundry man, through the stage when it was a most uncertain heating plant, through the stage when it was used, but not liked, until today when it is recognized as the ideal heating plant. But we are having a hard job selling this knowledge to the buying public. We have a long way to go before the public will accept the warm air furnace in its true state, but the time is coming and coming fast."

This story of Mr. Triggs' years in the industry was read because he stated it so faithfully exemplified the growth and experience of hundreds of men now in the business of making and selling warm air heat.

At the conclusion of Mr. Triggs' address the president introduced R. E. Caldwell of Milwaukee. Mr. Caldwell is a business analyst; a man who goes into sick businesses and takes them apart to see what is

wrong with their insides. As a result of his experience, but without a direct acquaintanceship with the warm air heating industry, he related some of the problems of the industry and guessed their practical solution.

"Business today," stated Mr. Caldwell, "is most assuredly not a problem of production. In every line of industry, yes in practically every individual business, production has been met and whipped and it would be difficult indeed to find any manufacturing plant not organized to produce many more units than it can sell.

"The country is reflecting this trend in industry. Production has increased to such a point that the public cannot possibly absorb all the things made for its eye, its ear, its nose, its touch, its comfort, its luxury, its necessity.

"Because of this situation the public is today very selective in its buying. It can buy any number of articles in the same class perhaps varying in price, perhaps varying in appearance, perhaps varying in value received. Every product, whether it be automobiles or radios or furnaces, is in competition with a number of other autos, or radios or furnaces offering the same features, in some cases the same price, in some cases a large price differential or better service. No one article today can truthfully claim it has the field to itself.

"And perhaps even more important to manufacturers of products like furnaces is the fact that the public's dollar which you feel you ought to get is being aggressively and persistently pursued by the radio, the auto, the clothing, the theatre and a hundred other industries.

"Not one man today in 50,000 is making enough money to buy all the things he is solicited on. The inevitable result is that the product that gets there first or that offers the strongest, most aggressive, most persistent appeal, gets the consumer's dollar and the rest of the manufacturing world is forced to view a public that may be inter-

ested, but which just hasn't got any money to buy.

"We can say as a result of this situation that business right now is good for those manufacturers, those lines of industry, those individual sellers who are out after business and who are letting nothing keep them from getting it. And conversely the individual, the firm, the industry which is content to sit and wait for sales to come in are just naturally going to drop out of the picture.

"And the sad part of that situation is that there won't be a single tear shed at their passing and they will be forgotten almost over night.

"The master brains of trade today are in the selling end of industry. The furnace industry is primarily an industry of producers. You are not salesmen. Your situation bears out my statement that the public is not buying—it is being sold. The public has not bought for five years, and unless some unheard of boom strikes industry the public won't be buying for many a year to come.

"We all, then, have to be salesmen. It doesn't make any difference whether our product is a radio or a washing machine or a furnace, we've got to get out and sell it. We've got to reorganize our firms, our industry, our associations into sales organizations. If we don't do this we might just as well make up our minds to get out and stay out.

"We've got to make up our minds that we are willing to pay for sales effort—and that means direct selling, mail selling, advertising. Selling—by word, by men, by sight—will have to be a guiding program of all manufacturers today and for many days in the future. If you do sell you will make money—if you don't sell you are going to be a past picture and your face will be turned to the wall."

This talk was received with much enthusiasm and the speaker was given whole-hearted support of the audience.

Following this the Research Advisory Committee reported out a

summarized conclusion of the latest information relative to research in warm air heating. This report was given in brief form and followed the outline below.

Summary of Principal Results from Investigations in Laboratory and Warm-Air Research Residence

I. Laboratory Results

1. Steel furnace with non-integral fins.
 - (a) Using 44-inch casing with and without fins.
 - (b) Using 48-inch casings with and without fins.
 - (c) Comparison with furnaces previously tested.

The master brains in business today are in merchandising. The furnace industry has been and is an industry of producers. If this industry is to advance, selling will have to replace production as the phase of business our brains, money, thought, and time are being expended upon.

II. Research Residence Results

1. Study of room air temperatures at five (5) stations in each room at floor, breathing level and ceiling.
2. Final results on house and furnace operation with six-blade propeller fan.
3. House and furnace operation with conversion gas burner; gravity circulation with single return duct.
 - (a) House operation characteristics.
 - (b) Furnace operation characteristics.
 - (c) Relative operating costs compared with coal, and seasonal costs.
4. Effect of wind and sunshine on house operation.

- (a) Effect of wind on fuel consumption.
- (b) Effect of weather conditions on air and surface temperatures — continuous study for 240 hours (10 days) under extreme weather conditions.

The conclusions reached from the tests made in these experiments will without doubt cause changes in the manufacturing and installing end of the heating business. It would be useless to report on these tests in the brief space permitted in this report of the convention, but full details will be published just as soon as the reports are ready for publication.

Tuesday Afternoon Session

In the afternoon session the question of what to do with rule 7 of the standard code came up for discussion. This was brought out as a result of incomplete tests run in Washington University, St. Louis, on the fire hazard of different types and installation practices for stacks between joists.

At the Columbus meeting, last year, it was voted to omit Note 7 of Section 6 in the seventh edition of the Standard Code. Inasmuch as the seventh edition has not yet been printed this year's meeting had to decide whether or not note 7 should be dropped. The meeting voted 14 to 8 to retain note 7 until such time as the tests were completed and the results justified a move one way or another.

The second speech of the program was by Jack Stowell of the Better Business Bureau. Jack gave an abbreviated address of the talks he has been giving before the state associations and dealers. This speech has been abstracted in past reports of the Indiana, Ohio and Michigan conventions in the ARTISAN, and does not need repetition. However, a complete discussion of this phase of the Association's activity will be given in a later issue.

Judge Watson was called upon to give a resume of the recently passed

(Continued on page 46)

Twisted Transition Fitting Rectangle to Rectangle

By L. F. HYATT

Contributing Editor

The necessity for a pattern for a twisted transition fitting oftentimes proves an insurmountable task to the person not acquainted with pattern drafting.

The problem in the illustration is a twisted transition fitting, the openings of which are rectangular in shape, of different sizes, and on a 30 degree angle to each other. The method of procedure is the same whether the openings are square or rectangular.

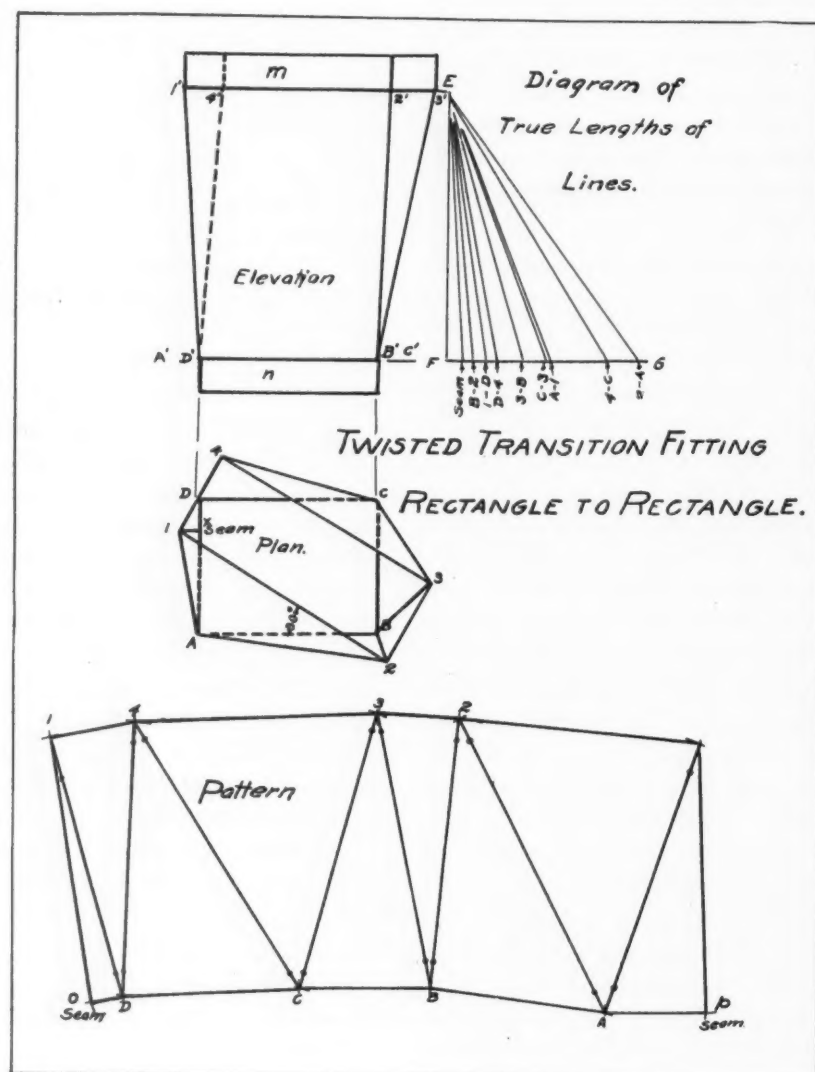
First draw the plan of the lower opening, in this case rectangle A B C D, and letter the corners. Then

locate the upper opening, draw, and number 1, 2, 3, 4. These two ends are drawn at an angle of 30 degrees to each other. Then draw the lines connecting the corners of the two rectangles; these corners represent the corners of the transition piece. These lines are shown on the pattern and the dots on them indicate that bends are to be made in "forming up" the fitting. The seam is now located. Some prefer seaming on one corner and others prefer

seaming on one side. In this development the seam is shown on the side, A, 1, D. The seam being here, makes it possible to use a grooved seam, which would not be satisfactory on one of the various corners.

After the pattern is completed the elevation may be drawn. First draw the horizontal lines, determining the distance between the collars m and n . Also draw lines parallel to the lines just drawn, the distance apart being the desired width of the collar. Lines projected up from A and D and B and C in the plan, intersecting the lines at the bottom in the elevation determine the width of the opening. Now from points 1, 2, 3, 4 in the plan project lines intersecting the upper horizontal lines and letter the points 1', 2', 3', 4'. Now draw the dotted line which represents the back corner D'-4' and the line A'-1', also the line C'-3' and B'-2'. This completes the elevation. It is well not to actually draw the lines from the plan to the elevation but rather to simply locate the points. In this way the fewer lines will lessen the danger of mistakes.

Before beginning the pattern it is necessary to find the true length of all lines representing the corners, as these lines in the elevation are foreshortened. By foreshortened we simply mean that the lines in the elevation can not be the exact, or true length. First draw the right angle E, F, G, E and F representing the exact distance between collars m and n . FG is drawn an indefinite length. Now with the dividers measure off the distance from 1 to x , on the line F, G, and from this point draw a line to E and mark seam as shown in the diagram of true length of lines. Next step off on F-G the distance A-1 and mark A-1 and draw the line A-1 to E.



Step off the distance A-2 on line F-G and draw the line A-2 to E. Now step off the distance B-2 on the line F-G, letter the point B-2 and draw the line to E as before. Step off the distance B-3 on line F-G, letter the point B-3 and draw the line from this point to E. Step off the distance C-3 from the plan, on line F-G, letter the point C-3 and draw the line from this point to E. Step off distance 4-C on the line F-G, letter the point 4-C and draw the line from the point to E. Step off on F-G the distance D-4, letter the point D-4 and draw a line from this point to E. Next step off on F-G the distance D-1, letter the point and draw a line to E. This completes the group of true lengths of lines necessary to develop a pattern for the body proper of the twisted fitting and the pattern may now be drawn.

Perhaps the method of procedure most common is to construct the triangle which is located mid-way between the two ends of the fitting. In this case it would be C-B-3. First draw a horizontal line and upon this line step off the distance C-B found upon the plan. The lines shown in the diagram of lines are, as previously explained, true length lines. Simply set the instruments from the various points lettered C-3, B-3, etc., to point E. Now with the true length C-3, and C as the center, strike an arc of indefinite length. Next with the true length B-3 and B as a center strike an arc intersecting the arc just drawn and letter this point 3. This completes the first angle. As the points are located it is advisable to draw the lines connecting them, thus describing the outline of each triangle. Next, from the plan, take length 3-4, using point 3 of the first triangle as a center, and strike an arc, and from the group of true length lines take the true length of 4-C and with C as a center strike an arc. The point of intersection of these two arcs will locate point 4, and then connect the points, completing the triangle C-3-4. Next from the plan take the distance C-D

and strike an arc of indefinite length on the pattern, with C as a center. Then from the diagram of true length lines take the true length of 4-D and strike an arc intersecting the one just drawn, which locates point D. Now take the distance 4-1 from the plan and with 4 on the pattern as a center strike an arc and with the distance 1-D from the diagram of true length lines, and D as a center, strike an arc intersecting the arc previously drawn. The point of intersection locates point 1. Next, from the plan take the distance D-x and strike an arc using D on the pattern as a center. Then take the true length of the seam line from the diagram of true length lines and strike an arc using 1 as a center, intersecting the arc previously drawn, locating the seam corner 0. This completes half of the pattern. Continuing, from the plan take the distance 3-2 and strike an arc of indefinite length, using 3 on the pattern as a center, and from the group of true length lines take

the distance B-2 and draw an arc intersecting the one just drawn, the point of intersection locating point 2. Next from the plan take the distance B-A and strike an arc, using B as a center, and from the group of true length lines take the distance 2-A and draw an arc with 2 on the pattern as a center, intersecting the arc just drawn. This locates point a and completes the triangle. Now take the distance 2-1 from the plan and strike an arc, using 2 on the pattern as a center, and then take the distance A-1 from the true length lines and strike an arc. The intersection of these arcs will locate point 1 and complete the triangle. Finally, take the distance from A to the seam in the plan and with A in the pattern as a center strike an arc of indefinite length, and with the true length of the seam line strike an arc intersecting the arc just drawn which will locate p on the seam line, thus completing the last triangle of the pattern. No allowances are made for the collars.

Let's Give the Young Sheet Metal Workers a Chance

Sheet metal contractors who are in need of an able apprentice in their shop will be interested in the following message sent out by J. A. Brandt, instructor in sheet metal, Mooseheart School, Mooseheart, Illinois, to producers and distributors of sheet metal:

"It is the conviction of many in close contact with the sheet metal trade that its future lies in the training given the apprentices of today, some of whom will become the contractors of tomorrow.

"We have reason to believe that the students of this department are receiving training that is efficient. Our graduates are more or less efficient in the use of the tools and small machines common to the trade; they have completed a regular pattern drafting course, based upon fundamentals; all have re-

ceived at least three months' experience on outside work, working eight hours per day, though the variety has been limited to Mooseheart buildings. They have not received intensive training in furnace work.

"This year we will have seven graduates from this department, five of whom will also be high school graduates. They are all about 18 years of age and in excellent health. All will enter the trade. The boys are orphans and will have no home to go to when they leave here, consequently they must have steady employment at a wage that will permit them to live. We wish to place them in shops where they will be permitted to apply the training given them, and finish learning the sheet metal trade as applied to building construction.

(Continued on page 46)

GRAVITY EXHAUST VENTILATION

Here's a Real Ventilation Problem

IF there is any field which calls for the use of a sheet metal man's brains and ingenuity it is the field of ventilation. In this field every job has to go in under a different set of conditions and after the successful solving of a number of varied problems.

If the factors are all successfully solved and taken into account, the job usually works. If the factors are not solved the job usually fails.

Just now we have on hand for your consideration a problem sent in by one of our readers. This job is one he was called in to figure out and suggest a remedy. Almost before he got started he ran into factors which he did not know just how to handle and so has asked us for some advice. But like all good advisors we do not depend upon our own knowledge for solutions, but use the knowledge and information of experts in the field. So we have asked Mr. Jordan of the Paul R. Jordan to give us a lift.

What he did was to come right back at us with some questions for us to answer. We feel that this problem is a real one and in order to make it interesting we would like to know if our ventilation department readers are up on their toes enough to know why we are being asked these questions.

Before we publish the answer we are going to publish the questions we were asked by Mr. Jordan. We would like to have any replies we can get telling us why Mr. Jordan asked us these ques-

tions and what you think will solve the problem. We will then publish the answers to the questions and publish Mr. Jordan's solution. So let's go.

Here follows the problem as it was originally sent in to us. We also show the layout.

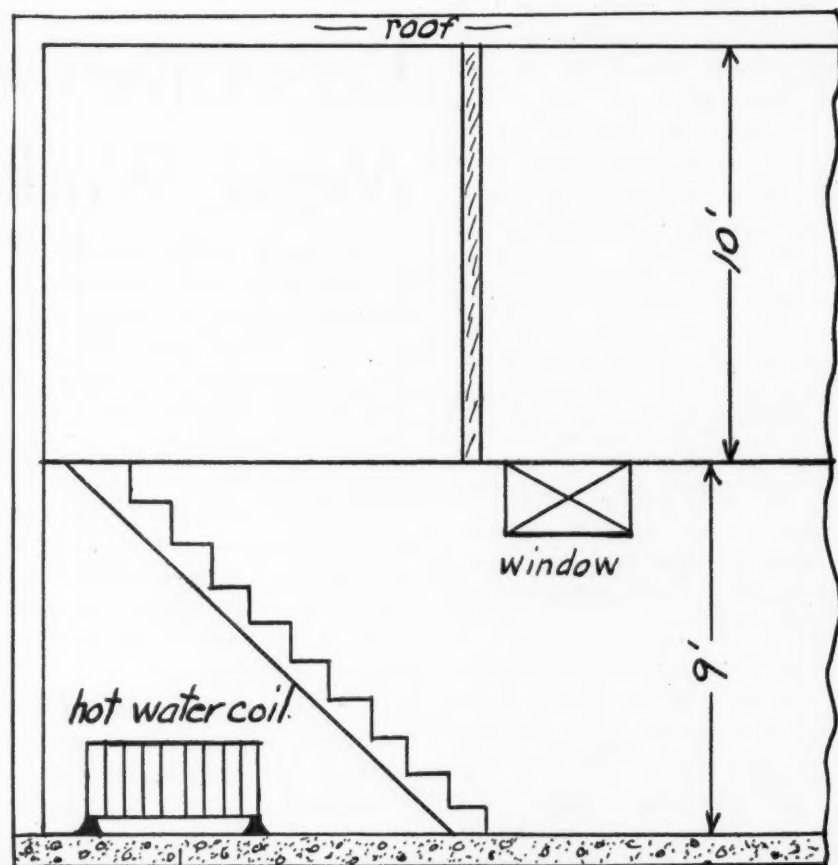
The building is on a southeast corner, the north and west sides facing intersecting streets, and being solid show windows of plate glass running from 12 inches above the floor to 24 inches below the ceiling. Above

the show windows are glass fixed transoms.

These windows sweat so badly that water runs down onto the floor. This is what the owner wants to cure.

The building is one-story with basement. No roof space to amount to anything.

The owner wants to know whether or not ventilation will solve his problem. The heat is **insufficient** as it is, but there is a hot water coil in the basement from which the heat is now



This shows the heights of the basement and first floor. The stairs are enclosed in a small room on the first floor, but are open in the basement. The hot water coil is located under the stairs and its heat is now wasted. No provision is made for utilizing this heat

wasted. How will **ventilation** affect the heating? Can the waste heat from the hot water coil be used.

As we said before we immediately were confronted with conditions not quite common. We sent the problem on to Mr. Jordan and got back the following:

The condensation problem brings out the necessity of a careful survey of any ventilating problem, so my answer for the present will consist of some questions.

1. What kind of heating system have they? Heating, condensation and ventilation are all related, and the kind of heat may throw some light on the cause, and will certainly affect the solution.

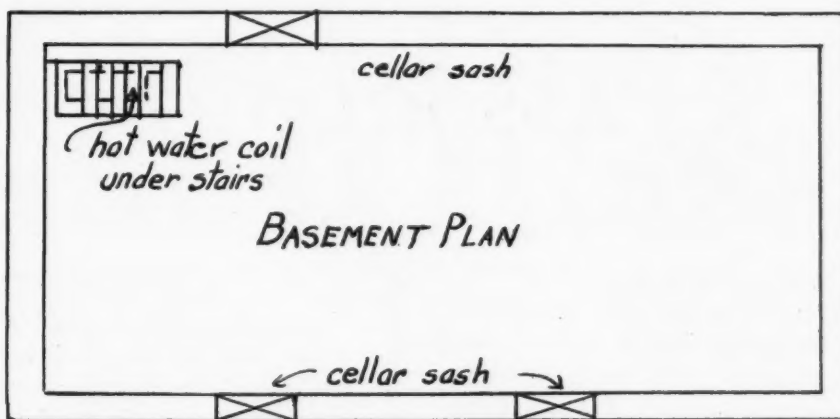
2. Are the show windows closed off or do they open into the room?

3. What is the room used for?

4. Is there anything in the room that throws off moisture into the room?

5. Are the cellar sash fixed or can they be opened?

6. What is the purpose of the hot water coil, shown in the basement? If this is an extra coil it may be utilized. If it is for basement heating, it will have to be handled in conjunction with the



This is the floor plan of the basement. Three windows placed high above the basement floor provide light and air. The only other opening is the stair well which is enclosed in a small room on the first floor. The hot water coil stands well under the stairs. The foundation walls are all concrete. So is the floor

basement conditions. Surrounding it with a hood and drawing air over it to be blown into the room above could only be done if its heat is not necessary to the basement. On the other hand if this is a metered steam job and the coil is for the purpose of cooling the condensation before it reaches the meter, then it had better not be tampered with.

7. Is the ceiling or roof insulated? Why is the heating now insufficient?

8. Is there at present any ventilation?

9. What is the floor temperature in cold weather. Do you know what the ceiling temperature is compared to the floor temperature? This will give us an

idea as to whether ventilation will help or hurt the heating.

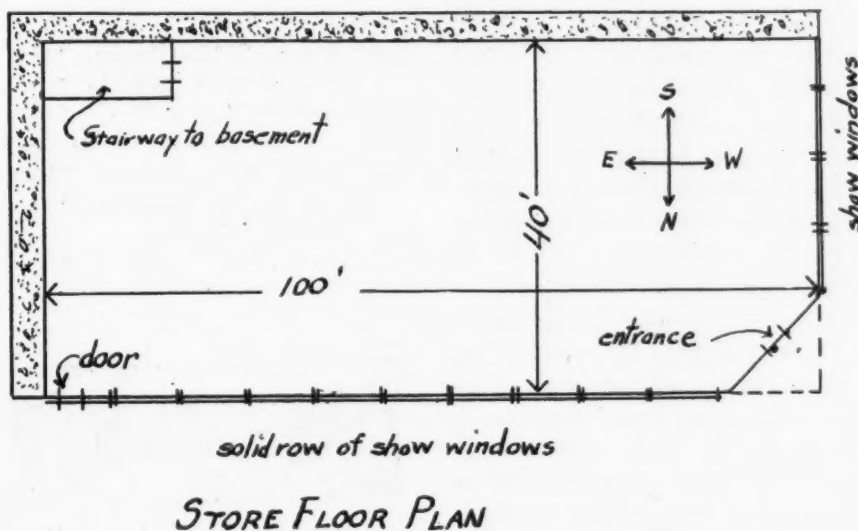
10. Is condensation present all the time or only in certain kinds of weather. When are conditions worst, and when are they best?

11. Can either fans or gravity be used for ventilation?

Condensation is due to two things, moisture laden air and cold surfaces. If either of these can be absolutely eliminated the problem is solved. But even normal air carries some moisture, and whenever it strikes a very cold surface, there is condensation. Furthermore, there are always likely to be relatively cool surfaces in any room, so that if the air is hot and is near saturation as to humidity, there is likely to be condensation. If the extremes can be avoided, and very moist air and very cold surfaces eliminated, then the condensation problem can be handled.

Conservation of heat throws an added difficulty in our way on this job, but we can at least attack the problem intelligently and see what can be done with it.

In the next issue we will publish the answers to the questions put by Mr. Jordan. From the answers to the questions we will reconstruct the situation and show these factors cause the trouble. Then by taking into consideration the things now wrong with the layout we will give Mr. Jordan's solution.



STORE FLOOR PLAN

This shows the floor plan of the first floor. Both the front and the long side are solid rows of large show windows which extend from 12 inches above the first floor to within 24 inches of the ceiling. Fixed transoms are above the windows



ASSOCIATION ACTIVITIES

Important Indiana District Meeting for Huntington, May 2

Chairman Tom Ewing of the local committee on arrangements for the meeting of the Fort Wayne District of the Steel Metal & Warm Air Heating Contractors' Association of Indiana, which will be held at Huntington May 2, announces that the afternoon's entertainment of visiting guests will be in charge of Mr. Purviance and Mr. Triggs of the Majestic Furnace Company of Huntington, and that the evening program is in charge of Frank DeWeese of Fort Wayne.

Mr. W. A. Hobson, secretary-treasurer of the P. & H. Supply Company of Fort Wayne, has been secured to give a chalk talk on Overhead. Mr. Hobson has made quite a study of overhead and is a recognized authority on the subject. Also Mr. Lee Hartzell, State Representative from Fort Wayne, will talk on the State heating code law.

The dinner will be at 6:30. Eastern Standard Time, at the Hotel LaFontaine.

Sheet metal contractors from points as far away as Bloomington, Richmond and Indianapolis have indicated their interest in going through the Majestic Furnace Company plant and are arranging to be on hand early in the afternoon. Inasmuch as the Majestic Furnace Company manufacture a great many things besides furnaces, this inspection tour will be of interest to all types of sheet metal contractors and others allied with the sheet metal industry. The Majestic Company has arranged transportation from the Hotel LaFontaine to their plant for those who desire it. Mr. Triggs is president of the National Warm Air Heating Association.

The entire meeting, both after-

noon and evening, will be informal, and while a great deal of valuable information will be absorbed by those in attendance, the primary purpose of the meeting is sociability and the establishment of contacts among the constituents of the sheet metal and furnace trade, which will lead to better understandings and a progressive development of the entire trade. The meeting is sponsored by the State Association, but is open to non-members as well as members. Jobbers, manufacturers, salesmen and manufacturers' representatives are invited. Advance reports from all parts of the State promise a well attended and interesting session.

Report Monthly Meeting Directors of Wisconsin Master Sheet Metal Ass'n

Pursuant to an invitation extended by the Sheboygan Local of the Wisconsin Sheet Metal Contractors' Association, the monthly meeting was held in the city of Sheboygan April 5 in the presence of a quorum of the board of directors and members of the State Association.

The secretary submitted his verbal report upon his activities during the past month. He visited the city of La Crosse upon an invitation received from the Sheet Metal Contractors' Association of that city and reported that a local organization was effected with a membership of seven, who immediately affiliated with the State and National Associations. The prospects are very bright to increase that membership to at least twelve. Correspondence is being kept up with Oshkosh, Two Rivers and Manitowoc, also other localities with the expectation of organizing locals in those respective regions.

The following members of the new La Crosse Local were duly

submitted for members of our State Association upon motion made by Paul L. Biersach, seconded by Wm. Gehrke, upon the presentation of the necessary applications received by your secretary at La Crosse, which motion was unanimously carried, thus: John Ledegar, Palmer Hanson, Herman Tietz, Edward Lassig, John Herman, Albert J. Svec, Frank Harget. Freise & Knebes of that local have been members of our State Association for some time.

Announce Winners in Slogan Contest of Nat'l Retail Coal Merchants' Ass'n

Some time back we announced the slogan campaign of the National Retail Coal Merchants' Association. The purpose of this campaign was to get a slogan which would adequately and best describe the value of coal as a heating agent.

This prize slogan contest has now been concluded and the winners have been announced.

The winners of the contest with their addresses and their winning slogans are:

1st Prize, \$500—Slogan, "Comfort of American Life"

Herbert Moeller, Urbana, Ill.

2nd Prize, \$200—Slogan, "Use Coal—Unless You Have 'Money to Burn'."

Mrs. J. M. Tribble, Senoia, Ga.

3rd Prize, \$100—Slogan, "Burn Coal! 2,000 Reasons in Every Ton"

Lewis C., Tee Garden, Portland, Ore.



National Association of Sheet Metal Contractors, Fort Pitt Hotel, Pittsburgh, Pennsylvania, June 10 to 13. W. B. Markle, 336 Fourth Avenue, Pittsburgh, Secretary.

RANDOM NOTES AND SKETCHES

One of the happy gloom dispellers of the trying period industry has just passed through is R. H. Bradley, president of the Kelsey Heating Company, Syracuse, N. Y.

Mr. Bradley, backing his optimism of the future with records of the present, showed figures illustrating actual shipment of heaters and materials to April 1 to be more than 100 per cent in excess over the corresponding three months of 1929 and in excess of shipments of any three similar months for the past four years.

As additional cheer, Mr. Bradley also states that contracts and orders now in files for shipment between now and August 15th will surpass those of any first eight months of any year for the past five years.

In characteristic fairness, Mr. Bradley points out that the demand for Kelsey generators, as well as the Kelsey all gas fired Conditionaire unit, has been from houses ranging in price from \$75,000 to \$250,000. This statement was made to indicate one of the reasons for the business up-curve. But in summary, it is a delightfully refreshing statement and portends many good things for the industry in general.

* * *

Now You Tell One

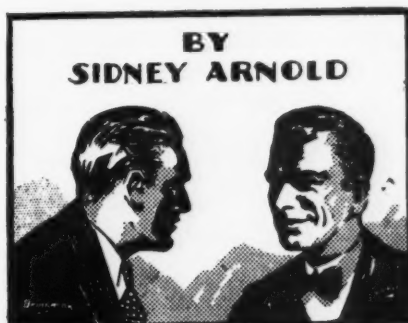
A group of traveling men were swapping lies about their radios in a Smith Center drug store. An old man had been listening silently.

"Got a radio, old man?" asked one of the drummers.

"Yeah," replied the old fellow. "I got a little two-tube affair. It's a pretty good one, though."

"Can you tune out these little stations with it?"

"Well, I was listening to a quartet the other night, an' I didn't like the tenor, so I just tuned him out and listened to the three of 'em."



Fred Gottschalk, the newly elected president of the Illinois Travelers' Auxiliary, came in to see me the other day. Fred has some good ideas as to how the auxiliary can be of greater service to the present association. He is anxious to get to work at once with his officers to help make next year's convention, which will be held in Chicago, a big success.

* * *

Not So Crazy?

The old lady was paying a visit to an asylum home which she had endowed. In the gardens she came across a youthful inmate fast asleep in a hammock.

"Why aren't you working with the rest, my boy?" she asked tartly, after waking him up.

"I'm crazy," came the candid answer.

"But surely crazy people can work?" argued the other, pointing to some of the toilers.

"Maybe," was the reply, "but I ain't as crazy as that."

* * *

Attention, Mert Allen

"Sir, would you give five dollars to bury a saxophone player?"

"Here's thirty dollars; bury six of 'em."



It is good to know that our old friends do not forget us. Early this week we were pleasantly surprised by a visit from John T. McRoy, who stopped in Chicago en route from California to his home in Washington. Although it is a number of years since McRoy retired from active business, many of the older men will remember him as one of the leaders in the stove and heating industry.

* * *

Whee!

"Why do you wear rubber gloves when cutting hair?" asked the customer.

"For the purpose," replied the barber, "of keeping our celebrated hair restorer from causing hair to grow on my hands."

He sold a bottle.

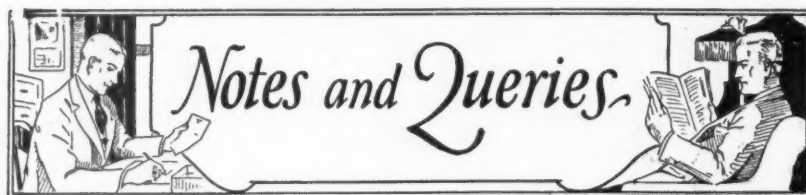
* * *

Sometimes we get a compliment on our paper. And like every person we like to let others know that someone appreciates our efforts.

Just the other day we got a letter from F. W. Haase of Denver, Colorado. He writes that he likes our paper and has learned a lot from its pages.

He also tells us that he has sold out his business to J. MacGennity who will carry on. We wish him all the success in the world in whatever he is going to do. We might, incidentally, tell him that there are lots of the boys who would like to sell out their business—especially when they have just lost a good job.

But when things are going right and work is coming in—well, there isn't many of them who can resist the temptation to carry on at the old stand. It's a business that gets into you and forever keeps your nose to the old grindstone.



Window and Store Fronts

From A. R. Harris, 260 Hohman St., Hammond, Indiana.

I should like to know the names of firms who construct window and store fronts.

Ans.—Kawneer Manufacturing Company, Niles, Michigan; The Newman Mfg. Co., Norwood, Cincinnati, Ohio; F. P. Smith Wire and Iron Works, 2436 Clybourn Ave., and W. S. Tyler Company, 310 South Michigan Ave., both of Chicago.

Gas Warm Air Furnaces

From Lincoln Stove Repair Company, Lincoln, Nebraska.

We should like to know the names and addresses of firms that make gas warm air furnaces.

Ans.—American Foundry & Furnace Company, Bloomington, Illinois; Calkins & Pearce, 751 East Long Avenue, Columbus, Ohio; Hess-Snyder Company, Massillon, Ohio; Meyers Fuel Saver Company, Janesville, Wisconsin; L. J. Mueller Furnace Company, Milwaukee, Wisconsin; Munkel-Rippel Heating Company, 4th Street at Goodale, Columbus, Ohio (gas attachment); Payne Furnace & Supply Company, Beverly Hills, California; The A. H. Robinson Company, Massillon, Ohio; Rudy Furnace Company, Dowagiac, Michigan; The XXth Century Heating and Ventilating Company, Akron, Ohio, and Wise Furnace Company, Akron, Ohio.

"Ruby" Soldering Fluid

From Floydada Sheet Metal Works, 311 South Main Street, Floydada, Texas.

Where can I get a gallon of "Ruby" soldering fluid?

Ans.—From the manufacturers, Ruby Chemical Company, Columbus, Ohio.

Chromium and Nickel Plating Equipment

From Wheeler Roofing and Heating Company, 166 East Main Street, Uniontown, Pennsylvania.

Can you advise us who makes equipment for chromium and nickel plating?

Ans.—Belke Manufacturing Company, 321 South California Avenue, and Hanson-Van Winkle-Munning Company, 549 West Washington Street; both of Chicago.

Sterling Silver Sheets

From Fred Magath, 309 North Jefferson Avenue, Mason City, Iowa.

Please tell me where I can secure sterling silver in sheets.

Ans.—Thomas J. Dee Company, 55 East Washington Street, and Goldsmith Brothers, 29 East Madison Street; both of Chicago.

Wood Spools

From Radio Units Company, P. O. Box 84, Salt Lake City, Utah.

Will you inform us who makes wood spools?

Ans.—The Atwood Crawford Company, Pawtucket, Rhode Island; Bogert and Hopper, Inc., 221 Varick Street, New York City; E. B. Estes and Sons, Inc., 70 East 45th Street, New York City, and Parker Spool and Bobbin Company, Lewiston, Maine.

Steel Garages

From H. Schultz, 3234 East 123rd Street, Cleveland, Ohio.

We would like to know who makes steel garages.

Ans.—Martin Steel Products Company, Mansfield, Ohio; The Thomas and Armstrong Company, London, Ohio; Trachte Brothers Company, Madison, Wisconsin; Western Steel Products Company, Duluth, Minnesota, and The Stefco Steel Company, Michigan City, Indiana.

Gas Furnaces

From Wichita Falls Sheet Metal Works, 1409 13th Street, Wichita Falls, Texas.

Can you tell us who makes gas fired warm air furnaces?

Ans.—American Foundry and Furnace Company, Bloomington, Illinois; Calkins and Pearce, 751 East Long Avenue, Columbus, Ohio; Hess-Snyder Company, Massillon, Ohio; Meyers Fuel Saver Company, Janesville, Wisconsin; L. J. Mueller Furnace Company, Milwaukee, Wisconsin; Munkel-Rippel Heating Company, 4th Street at Goodale, Columbus, Ohio (gas attachment); Payne Furnace and Supply Company, Beverly Hills, California; The A. H. Robinson Company, Massillon, Ohio; Rudy Furnace Company, Dowagiac, Michigan; The XXth Century Heating and Ventilating Company, Akron, Ohio, and Wise Furnace Company, Akron, Ohio.

Tin Cans

From Auburn Furnace Company, West 7th Street, Auburn, Indiana.

Please tell us who makes round tin cans, 3½ by 3½ inches with slip over covers, similar to those used for paste soap.

Ans.—American Can Company, 104 South Michigan Avenue, Chicago, Illinois.

Course in Sheet Metal Estimating

From Roy Anderson, 3034 Third Street, North, Minneapolis, Minnesota.

Where can I get a course in sheet metal estimating and blow piping engineering?

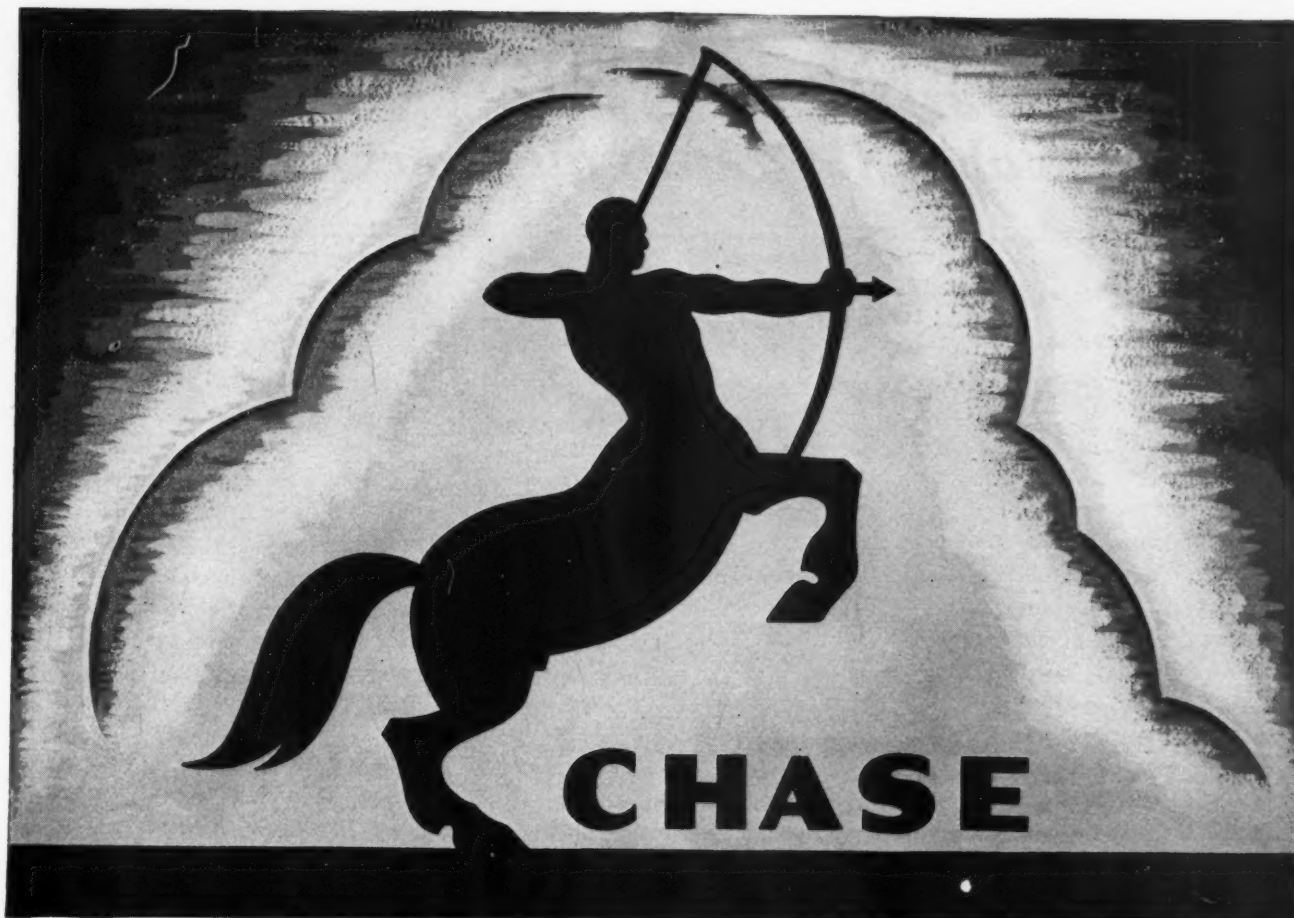
Ans.—St. Louis Technical Institute, 4543 Clayton Avenue, St. Louis, Missouri.

Electric Water Heaters

From William S. Shuster, 105 Columbia Avenue, Pitman, New Jersey.

Please tell me who makes an electric water heater to heat a 30-gallon boiler.

Ans.—Crane Company, 836 South Michigan Avenue, Chicago, Illinois; Cutler-Hammer, Inc., 1218 St. Paul Avenue, Milwaukee, Wisconsin; Westinghouse Electric and Manufacturing Company, East Pittsburgh, Pennsylvania, and Edwin L. Wiegand Company, 7508 Thomas Boulevard, Pittsburgh, Pennsylvania.



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***“Full weight . . .
Honest gauge . . .
Uniform quality . . .”***

HERE'S copper of the highest quality that you can always identify—at a glance. Chase Copper Gutters, Downspouts and Roofing Accessories carry the distinctive Chase-mark.

This marking is your guarantee of 16-oz. copper—tested for weight, gauge and quality.



The same is true of soft roll copper . . flat strip copper . . any Chase metal you use.

Order these Chase products from the nearest Chase warehouse and you'll get the promptest kind of service. Use them on your jobs and you'll do the most satisfactory and profitable work.

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Canadian Rep.: W. E. Booth Co., Ltd., Toronto, Ontario. Mills and Home Office, Waterbury, Connecticut.

Say you saw it in *AMERICAN ARTISAN*—Thank you!

NEW ITEMS *and* NEWS ITEMS

From and about the Manufacturers and Jobbers

Ku-No Register Co. Announces a New Warm Air Register

The Ku-No Register Manufacturing Company of St. Louis are now offering the trade a new warm air register. Several features are announced for the new unit.

One of the most interesting is the wide variety of colors available in the new unit. The colors are arranged in the form of colored vein upon a secondary colored background. At the present time the following color combinations are available—Gold on Pink, Gold on Blue, Gold on Black, Green on Black, Gold on Green and Gold on two-toned red-brown.

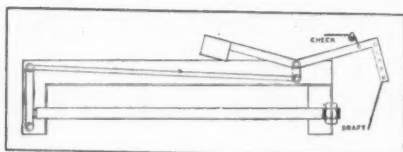
The register is so designed that the manufacturer claims it is cleaner, affords the transmission of a larger amount of heat, is standardized for fewer sizes, has greater free area face opening and has a removable face without springs, buckles or screws. The face snaps in or out without the aid of tools.

Noll Regulator Co., Youngstown, Has New Furnace Regulator

The Noll Regulator Company of Youngstown, Ohio, recently sent us a pamphlet describing a new furnace regulator on which they have just received patent. This regulator is interesting in several ways.

The manufacturer describes the regulator as follows:

The Noll Regulator is built of



steel, electrically welded, sturdy and fool-proof. It consists of a main frame which is fastened to the top of casing hood, an expanding unit

which passes through the casing hood, and a lever mechanism which is governed by the expanding unit and which in turn operates the draft and check of the furnace. The expanding unit is acted upon by the warm air within the casing, expanding and contracting with the variations in temperature, and operating the draft and check accordingly. The furnace is started with the check closed and the draft slightly open. As the furnace warms up, the expanding unit lengthens and closes the draft and opens the check. Following the checking of the furnace, should the temperature within the casing begin to fall, the expanding unit will begin to contract, bringing the draft back open and heating up the air to a higher temperature, thus maintaining a uniform combustion and a uniform temperature within the furnace jacket.

This principle of control from the heater casing, while it may seem like a radical departure from the old system of room control, is just as fundamentally sound as that of the instantaneous water heater and the kitchen range oven regulator.

The adjustment for varying weather conditions is accomplished by a very simple method. By referring to Fig. 1 it will be noted that the front level of the regulator, to which the draft is attached, is provided with a series of eight holes into which the draft chain may be hooked. The regulator is set in its neutral position with the furnace cold, so that when the draft chain is hooked in the lowest hole the draft and check are both closed. The next procedure is to hook the draft chain into one of the higher holes, depending upon the severity of the weather, so as to give the draft the required opening to maintain the proper temperature for the

existing weather conditions.

The operator soon learns that during the mild weather of spring and fall the draft chain hooked into the second or third hole will give sufficient draft opening to maintain a proper room temperature during this weather. As the weather turns colder, the operator merely hooks the draft chain into a higher hole, which requires a higher temperature in the furnace casing to expand the regulator and close the draft. Thus any desired temperature can be obtained and maintained by simply varying the draft opening.

Osborn Company Brings Out New Roofing Clip

The J. M. and L. A. Osborn Company has just brought out for the roofing trade a new and improved clip. In its announcement the company says:

For fastening corrugating roofing



and siding to steel work, are made from $\frac{1}{8}$ "x $\frac{5}{8}$ " Half Oval Bars. Because of this fact they are oval on the outside, flat on the inside and conform perfectly to both the corrugations of the sheet and to the flat surfaces of the channel or "I" beam purlines.

The hooked end of the slip is so shaped that it will adjust itself to any standard channel or "I" beam used for purlines. The clips are packed in boxes containing 1,000 clips with a burr for each.



TONCAN

*means more business
because it creates good will!*

USE Toncan for sheet metal work and your customers will give you the sort of good will that results in increased sales, repeat business.

For Toncan is *permanent!* Toncan resists rust and corrosion. It is not harmed by fire, and properly grounded, Toncan roofs make perfect lightning protection.

For roofing, for spouting; for culverts and metal lath and pipes, Toncan is ideal. Toncan is a scientific alloy of pure iron, pure copper and molybdenum. Manufacturers use it wherever resistance to the elements, to rust and corrosion, is essential.

Write for full details about the Toncan business building plan for the sheet metal contractor.

CENTRAL ALLOY STEEL CORPORATION

Massillon (and Canton) Ohio



WORLD'S LARGEST AND MOST HIGHLY SPECIALIZED ALLOY STEEL PRODUCERS

Say you saw it in AMERICAN ARTISAN—Thank you!

THE EDITORIAL

(Continued from page 21)

stokers which burn cheap fuel, work automatically day and night, and even handle their own ashes.

If we really want a high class heating plant we buy a plant which filters and washes and heats and humidifies the air and then blows it gently into every corner of our houses and does this day in and day out without any attention on the part of the home owner.

Out of our industry have sprung concerns which are providing perfect air conditions for great theaters, churches, offices, homes, skyscrapers. In these structures tenants never think of opening windows—for the air inside is automatically maintained with exactly the right amount of heat, or cold, humidity; is cleaned, washed and gently swirled around the occupants.

The warm air heating industry can't help but profit through such installations. Folks don't enjoy such conditions day after day without becoming imbued with the desire to have just the same thing in their own home. And we are ready to give it to them.

No industry can make the strides we have and are making without having internal growing pains. We are in those pains today. We have so many great things we want to tell the public about we don't know where or how to begin. We're amateurs in the art of getting our proposition before the public. Some of us are feverish to go ahead—others are cautious because of uncertainty.

Our industry has a great untapped wealth of features which we must get into the dealer's and public's mind. And those features have come so fast that neither the public nor the dealer is prepared to receive them. We've got to begin fundamental education all up and down the line. The public has to be educated, the dealer has to be educated, the jobber has to be educated, the salesmen have to be educated and—yes—the manufac-

turers have to be educated.

Let's not get discouraged. Our troubles are troubles of PROGRESS. Some of us, perhaps, are going to fall by the wayside. The pace is getting faster and the accelerator will be pushed closer and closer to the floorboard as time goes on.

ADVERTISING BY RADIO

(Continued from page 29)

many humorous wisecracks that proved people were hearing the program. After interest was built up an essay contest was announced. Listeners within the radius of 200 miles of the station were asked to write 300 words about the condition of their furnace, if they possessed a poor one. The response brought a large number of entries and long after the contest closed write-ups kept piling in. To the owner of the worst furnace we presented a new Niagara. To the owner of the second worst furnace we gave \$50 in cash.

THE N. W. A. H. A. MEETING

(Continued from page 35)

Federal Trade Practice Regulations for the Warm Air Furnace industry, and explained these regulations. A discussion of these regulations was printed in the ARTISAN.

Following a discussion of the work of the Association, H. T. Richardson told the convention what the Institute was and what it was doing. According to Tommy, the Institute is a group, open to any manufacturer, which has joined hands to rid the industry of such evils as consignment, cut-throat competition, misstatement and misrepresentation, etc.

Evening Program

In the evening the annual banquet was held in the Statler Hotel. Practically every one registered attended and the entertainment provided was well arranged and enthusiastically received. To say the least the program was varied. A ladies' orchestra under the direction of a soprano who had a voice powerful

if nothing else, made the banquet hall ring with music. In between musical numbers a ventriloquist, a magician and the prima donna entertained. The magician, with the aid of the Copper and Brass Research Bureau, and several little boys like Jim Triggs went over big, especially when he took eggs out of the mouths of the babes and got a smashed egg in his own hat in return.

The speaker of the evening, Yohn Harper, told how to make an after-dinner speech consisting mostly of funny stories.

Wednesday's Program

The morning program was divided into two meetings. At one manufacturers discussed their problems behind closed doors and ironed out several problems which have been holding back advancement all this year. In the other meeting the Research Session held a second and more detailed discussion of this past year's research work. This part of the program will be reported in detail later.

THE FLOOR DRAFT PROBLEM

(Continued from page 32)

His solution is short and snappy but necessitates revamping of the layout. He would practically change the arrangement, and says:

"I would install three 12-inch warm air pipes to double heads, 10-inch run to 10 by 12 floor register, 9-inch run to stack to second floor, put on 14-inch cold air pipes as per marking. Would prefer single register in dining room as per marking. Why leave out the largest room in the house and not take any cold air out of it?"

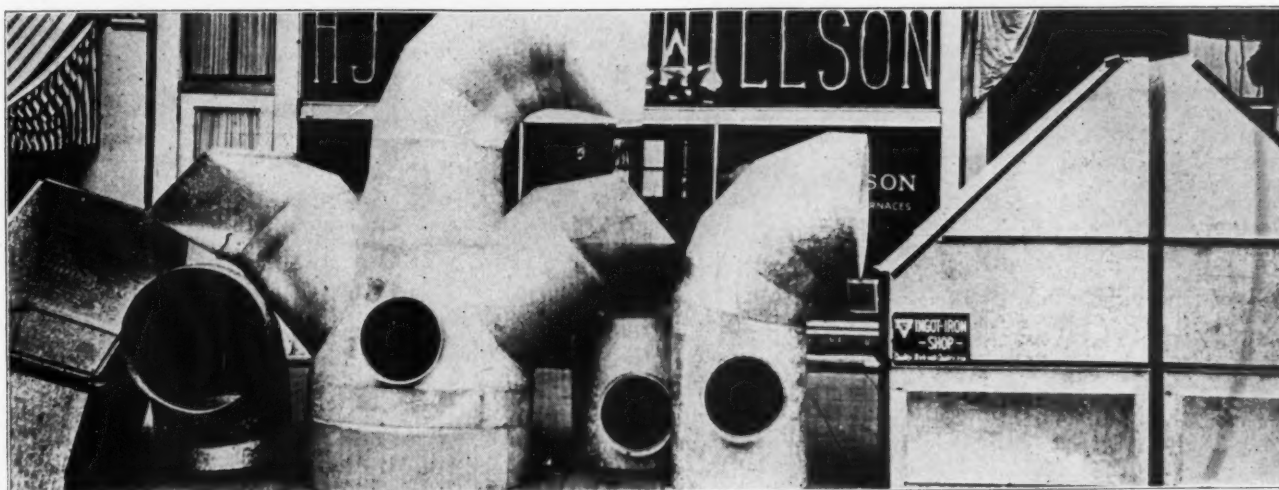
GIVE BOYS A CHANCE

(Continued from page 37)

"These boys will graduate on or about July 1st, though some could leave at any time now, especially if the job was near enough so that they could return here for graduation. Most of them will go to any part of the country where employment can be secured for them."

ARMCO

INGOT IRON



...the sheet metal that wins customers

These Armco Ingot Iron ducts and collector boxes are part of a vast dust collecting system installed for the Walton Veneer Company, of Everett, Washington, by the H. J. Willson Sheet Metal Works of that city. Contractor Willson is a firm believer in the customer-satisfying, easy-working merits of Armco Ingot Iron.

THERE are many prospects that you would like to convert into customers. You can, too, with rust-resisting Armco INGOT IRON. Property owners, architects, engineers, plant owners—these important prospects of yours know and approve Armco INGOT IRON. They have confidence in it, feel certain that its use will bring long, trouble-free service.

And, of course, there are appreciable savings for you in the shop. Armco INGOT IRON works easily and surely, no matter how difficult the forming operation.

Order a supply of Armco INGOT IRON sheets and formed products. There is an Armco Distributor near who will be glad to serve you.

This is the familiar symbol that identifies Armco Ingot Iron sheets and formed products. It stands for the skill and experience of Armco—a company that has pioneered and specialized in the manufacture of high-grade special analysis iron and steel sheets for nearly thirty years. Always point out this triangle to your customers, so they may know they are getting long-lasting, low-cost sheet metal.



THE AMERICAN ROLLING MILL COMPANY
Executive Offices, Middletown, Ohio

Export: The ARMCO International Corporation

DISTRICT OFFICES:	Chicago	Detroit	Pittsburgh
	Cincinnati	New York	St. Louis
	Cleveland	Philadelphia	San Francisco

“BE SURE IT’S

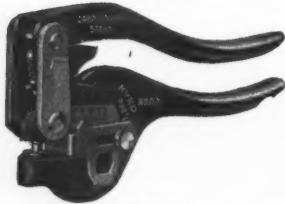
MADE OF ARMCO INGOT IRON”

Say you saw it in AMERICAN ARTISAN—Thank you!

HYRO METAL PUNCHES

No. O. X.

The Most Powerful Punch of Its Size on the Market



Patented
Dec. 9, 1919—No. 1,324,621
June 6, 1922—No. 1,418,474

Here are a few of the many features of the famous No. O. X.: (1) Measures only 8" overall and weighs but 2½ lbs. (2) Can be easily operated with one hand, allowing the other hand to be used for guiding the work. (3) Powerful; punches ¼" hole in 14 gauge or equivalent with ease. (4) Front pointer and side gauge combination, an exclusive feature of the O. X., enables you to punch holes exactly where you want them, many times eliminating center punching.

The No. O. X. Punch is furnished as shown above complete with three sets of punches and dies, one each of the following sizes: ⅛", 3/16", and ¼". Stock sizes of punches and dies for the No. O. X. are 3/32", ⅛", 5/32", 3/16", 7/32", ¼" and 17/64". Intermediate sizes of round punches and dies can be made to order.

No. X. X.

The Only Combination Bench and Hand Punch

The No. X. X. Punch is the only combination bench and hand punch on the market. This unique feature allows the work to be carried to the punch or the punch to the work, as required. A pull of the pin releases the punch from the bench stand.

This punch has an unusual deep throat opening of 3½" deep by 2⅛" high, allowing the punching of channels, irregular shapes and forms.

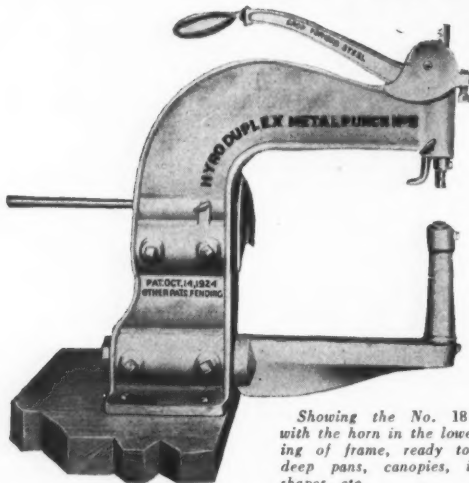
The No. X. X. Punch measures 9" overall and weighs but 4½ lbs. It has a capacity of ¼" hole in 14 gauge, ⅜" hole in 16 gauge, or 17/32" hole in 18 gauge.



Patented April 4, 1922,
No. 1,411,809

No. 18 DUPLEX

An Ideal Tool for Punching Holes in Special Shapes

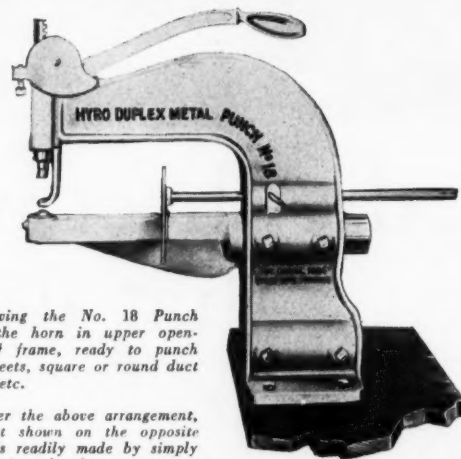


Showing the No. 18 Punch with the horn in the lower opening of frame, ready to punch deep pans, canopies, irregular shapes, etc.

The No. 18 Hyro Duplex Metal Punch, because of its exceptionally deep throat—10" deep by 6" high—will punch holes up to 1-1/16" round in practically every conceivable shape of light gauge metal.

This punch is furnished with a sliding back gauge which can be adjusted to any depth, enabling the operator to punch holes in the same location without "fishing" for the hole.

Patented
October 20, 1925
No. 1,558,289



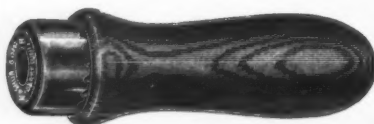
Showing the No. 18 Punch with the horn in upper opening of frame, ready to punch flat sheets, square or round duct work, etc.

Either the above arrangement, or that shown on the opposite side, is readily made by simply unscrewing the four set screws on the side of the frame.

The Hyro No. 18 Duplex Metal Punch is furnished with one round punch and die, automatic stripper, extension (for use when horn is in lower opening of frame) and adjustable gauge.

We recommend the No. 18 Punch for jobs requiring a ⅜" hole in 16 gauge steel, a 5/8" hole in 20 gauge steel, or a 1" hole in 22 gauge steel, and other sizes of holes in proportionate gauges of metal.

HYRO Shur-Grip SOLDER IRON HANDLE



Patented April 24, 1923—No. 1,453,082

Cuts a thread on the stem of the solder iron as it is being screwed on. Once on, it stays on. Can't split. Can't get loose or come off unless it is unscrewed.

Safe and comfortable to use. Won't burn. Pays for itself over and over again in the time it saves.

Used in thousands of sheet metal shops. Made in three sizes for 1½ to 12 lb. Solder Irons.



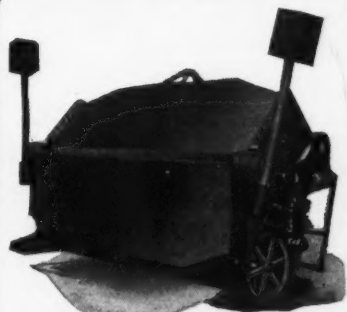
Showing inside construction of the Shur-Grip Solder Iron Handle. The heat escapes through the hole in the direction indicated by arrows.

Hyro Manufacturing Co., Inc., 202 Varick St., New York

Say you saw it in *AMERICAN ARTISAN*—Thank you!

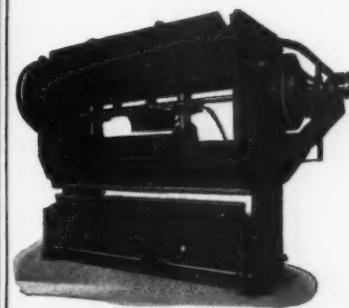
CHICAGO STEEL BENDING BRAKES AND FORMING PRESSES

The perfected result of over 30 years experience in the manufacture of sheet metal bending machines. Over 25,000 machines in use.



POWER BRAKE

Hand Brakes
Cornice Brakes
Power Brakes
Box and Pan Brakes
Forming Presses
Special Brakes and Presses



FORMING PRESS

The most complete and up-to-date line of sheet and plate bending and forming machines in the world. Lengths, 3 to 16 feet, with capacity to bend from the lightest metals up to $\frac{3}{4}$ in. plate, cold.

DREIS & KRUMP MANUFACTURING CO.

7404 Loomis Street • Chicago

Whitney Hand Punch No. 6

The Ideal Punch for:—

Skylight Work—Flange Punching
Button Punching

No. 6 Punch



Capacity:—

$\frac{1}{4}$ inch Hole Through
 $\frac{3}{16}$ inch Iron

Punches:—

$\frac{1}{8}$ inch to $\frac{9}{32}$ inch
by $\frac{1}{32}$ nds

Better Work With Less Labor
OVER 40,000 IN ACTUAL SERVICE

W. A. WHITNEY MFG. CO. TOOLS



No. 4
Tinners' Punch



Capacity:—

$\frac{1}{4}$ inch Hole Through 16 Gauge

Punches:—

$\frac{1}{16}$ inch to $\frac{17}{64}$ inch by $\frac{1}{64}$

Punch and Die Stay in Perfect Alignment Because
Side Plates Carry the Strain
Has Adjustable Gauge to Regulate Holes
from Edge

W. A. WHITNEY MFG. CO.

636 Race Street

Established
1908

Rockford, Ill.



Say you saw it in AMERICAN ARTISAN—Thank you!

Chicago Warehouse Metal and Furnace Supply Prices

AMERICAN ARTISAN is the only publication containing Western Metal, Furnace Supply and prices corrected bi-weekly

Note: These Prices Are Chicago Warehouse Prices of Metal, to Which Must Be Added Freight to Cities Outside of Chicago

METALS

PIG IRON

Chicago Fdy., No. 2	\$19.50
Southern Fdy. No. 2, 18.20 to 19.01	
Lake Superior Charcoal	23.04 to 27.04
Malleable	19.50

FIRST QUALITY BRIGHT CHARCOAL TIN PLATES

IC 20x28 112 sheets	\$22.50
IX 20x28	25.50
IXX 20x28 56 sheets	14.50
IXXX 20x28	15.50
IXXXX 20x28	17.00

TERNE PLATES

IC 20x28, 40-lb. 112 sheets	\$25.00
IX 20x28, 40-lb. 112 sheets	27.75
IX 20x28, 25-lb. 112 sheets	21.15
IX 20x28, 25-lb. 112 sheets	23.80
IX 20x28, 20-lb. 112 sheets	19.55
IV 20x28, 20-lb. 112 sheets	22.05

"ARMCO" INGOT IRON PLATES

No. 8 ga.—110 lbs.	\$4.15
3/16 in.—100 lbs.	4.05
1/4 in.—100 lbs.	3.85

COKE PLATES

Cokes, 80 lbs., base, 20x28	\$12.00
Cokes, 90 lbs., base, 20x28	12.20
Cokes, 100 lbs., base, 20x28	13.75
Cokes, 107 lbs., base, IC,	
20x28	12.75
Cokes, 135 lbs., base, IX,	
20x28	14.75
Cokes, 155 lbs., base, 2X,	
56 sheets	8.50
Cokes, 175 lbs., base, 3X,	
56 sheets	9.35
Cokes, 195 lbs., base, 4X,	
56 sheets	10.25

BLUE ANNEALED SHEETS

Base 10 gal.per 100 lbs.	\$3.35
"Armco" 10 ga.per 100 lbs.	4.15

ONE PASS COLD ROLLED BLACK

No. 18-20per 100 lbs.	\$3.85
No. 22per 100 lbs.	4.00
No. 24per 100 lbs.	4.05
No. 26per 100 lbs.	4.15
No. 27per 100 lbs.	4.20
No. 28per 100 lbs.	4.30

GALVANIZED

No. 16per 100 lbs.	\$4.10
No. 18per 100 lbs.	4.20
No. 20per 100 lbs.	4.40
No. 22per 100 lbs.	4.45
(Standard differentials on extras to apply)	
No. 24per 100 lbs.	\$4.60
No. 26per 100 lbs.	4.85
No. 27per 100 lbs.	4.95
No. 28per 100 lbs.	5.10
"Armco" 24per 100 lbs.	6.15

BAR SOLDER

Wt. granted 50-50per 100 lbs.	\$25.25
45-52per 100 lbs.	23.75
45-55per 100 lbs.	22.50
Pt. umbersper 100 lbs.	20.50

ZINC

In Slabs	\$5.75
----------	--------

SHEET ZINC

Cask Lots (600 lbs.)	\$12.00
Sheet Lots (100 lbs.)	13.00

BRASS

Sheets, Chicago base	20 1/2 c
Mill base	19 1/2 c
Tubing, brazed, Chicago base	25 c
Mill base	27 c
Tubing, seamless, Chicago base	25 1/2 c
Mill base	24 1/2 c
Wire, Chicago base	21 c
Mill base	20 c
Rods, Chicago base	18 1/2 c
Mill base	17 1/2 c

COPPER

Sheets, Chicago base	23 1/2 c
Mill base	22 1/2 c
Tubing, seamless, Chicago base	26 c
Mill base	25 c
Wire, plain rd., 8 B. & 8. Ga. and heavier	21 1/2 c

LEAD

American Pig	\$6.50
Bar	8.50

TIN

Bar Tin	per 100 lbs. \$42.00
Pig Tin	per 100 lbs. 40.00

SHEET METAL SUPPLIES, WARM AIR FURNACE FITTINGS AND ACCESSORIES

ASBESTOS

Paper up to 1/16	6c per lb.
Roll board	7 1/2 c per lb.
Mill board 3/32 to 1/2	7 1/2 c per lb.
Corrugated paper (250 sq. ft. per roll)	\$6.00 per roll

ASBESTOS SEGMENTS

8 in.	per 100 sets \$7.30
9 in.	per 100 sets 8.30
10 in.	per 100 sets 9.30
12 in.	per 100 sets 10.50

CEMENT FURNACE

American Seal, 5-lb. cans, net	\$0.40
American Seal, 10-lb. cans, net	0.80
American Seal, 25-lb. cans, net	2.00
Pecora	per 100 lbs. 7.50

CLIPS

Damper	
No-Rivet Steel, with tail pieces, per gross	\$9.50
Rivet Steel, with tail pieces, per gross	7.50
Tail pieces, per gross	2.40

COPPER FOOTING

Less than 100 ft.	32 %
100 ft. or over	34 %

CORNICE BRAKES

Chicago Steel Bending	
Nos. 1 to 6B	Net

CUT-OFFS

Cal., plain, round or cor. rd.	
26 gauge	30 %
28 gauge	35 %

DAMPERS

Yankee Hot Air	
7 inch, doz.	\$1.60
8 inch, doz.	2.20
9 inch, doz.	2.60
10 inch, doz.	2.80
12 inch, doz.	3.50
14 inch, doz.	5.00

EAVES TROUGH

Galv. Crimpedge, crated	75-10 %
Zinc, "Barnes"	60 %

ELBOWS

Conductor Pipe	
Galv. plain or corrugated, round flat Crimp.	
28 gauge	60 %
26 gauge	45 %
24 gauge	15 %

Galv. Terne Steel

Plain Rd. and Rd. Corr.	
28 gauge	60 %
26 gauge	45 %
24 gauge	15 %

Square Corrugated

28 gauge	50 %
26 gauge	35 %

Portico Elbows

Standard Gauge Conductor Pipe, plain or corrugated.	
Not nested	70 & 5 %
Nested solid	70 & 5 %

Sq. Corr., A. & B. & Octagon

28 gauge	50 %
26 gauge	35 %

Portico

1, 1 1/4, 1 1/2 inch	45 %
----------------------	------

Copper

16 oz. all designs	45 %
--------------------	------

Zinc

All styles	60 %
------------	------

ELBOWS—Stove Pipe

1-piece Corrugated, Uniform Blue "Milcor" No. 28 Gauge.	Doz.
5 inch	\$1.15
6 inch	1.26
7 inch	1.75

Special Corrugated

6 inch	\$1.00
7 inch	1.60

Adjustable—Uniform Blue

"Milcor" No. 28 Gauge, Uniform Blue.	
5 inch	\$1.60
6 inch	1.75
7 inch	2.10

WOOD FACES—60 % off list.

FIRE POTS

Geo. W. Diener Mfg. Co.	
No. 02 Gasoline Torch, 1 qt.	Each \$5.13
No. 9250, Kerosene, or Gasoline Torch, 1 qt.	6.50
No. 10 Tinner's Furnace Square tank, 1 gal.	11.20
No. 15 Tinner's Furnace Round tank, 1 gal.	10.70
No. 21 Gas Soldering Furnace	8.00
No. 110 Automatic Gas Soldering Furnace	10.50

GLASS

Single and Double Strength, A, all brackets	85 %
Single and Double Strength, B, all brackets	87 %

HANGERS

Conductor Pipe	
Milcor Perfection Wire	25 %
Milcor Triplex Wire	10 %

Eaves Trough

Milcor Steel (galv. after forming) from list	45 %
Milcor Selflock E. T. Wire, List	10 %

HOOKS

Conductor	
"Direct Drive" Wrought Iron for wood or brick	15 %

MITRES

Galvanized Steel Mitres	
28 gauge	70
26 gauge	60-20

PASTE

Asbestos Dry Paste

200-lb. barrel	\$15.00
100-lb. barrel	7.75
50-lb. pail	4.50
25-lb. pail	2.50
10-lb. bag	1.20
5-lb. bag	0.60

PIPE

Galvanized

Crated and nested (all gauges)	75-7 1/2 %
Crated and not nested (all gauges)	75-2 1/2 %

Furnace Pipe

Double Wall Pipe and Fittings	60 %
Single Wall Pipe, Round Galvanized Pipe	60 %
Galvanized and Tin Fittings	60 %

Lead

Per 100 lbs.	\$12.50
Stove Pipe	
"Milcor" "Titelock" Uniform Blue	
28 gauge, 5 inch U. C. nested	\$11.00
28 gauge, 6 inch U. C. nested	12.00
28 gauge, 7 inch U. C. nested	14.00
30 gauge, 5 inch U. C. nested	10.25
30 gauge, 6 inch U. C. nested	11.00
30 gauge, 7 inch U. C. nested	13.00

T-Joint Made Up

6 inch, 28 ga.	per doz. \$3.40
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REGISTERS AND FACES

Floor Registers

Except Cast Iron	40 & 10 %
Cast Iron	20 %

Baseboard

2-Piece	40 & 10 %
1-Piece	40-10 & 20 %

Adjustable Ventilators

Adjustable Cold Air Faces	40 & 10 %
Adjustable Ventilators	40 & 10 %

RIDGE ROLL

Galv. Plain Ridge Roll, b'd'd	75-15-5 %
Galv., Plain Ridge Roll, crated	75-15 %

SCREWS

Sheet Metal	
7, 1/4 x 3/4, per gross	\$0.52
No. 10, 3/8 x 1/2, per gross	0.68
No. 14, 1/2 x 3/4, per gross	0.83

SHEARS, TINNERS' AND MACHINISTS'

Viking	\$22.00
Lennox Throatless	
No. 18	35 %
Shear blades (f. o. b. Marshalltown, Iowa.)	10 %

SHOES

Galv. 28 Gauge, Plain or Corrugated, round flat crimp	60 %
26 gauge, round flat crimp	45 %
24 gauge, round flat crimp	15 %

SNIPS, TINNERS'

Milcor	Net
--------	-----

VENTILATORS

Standard	30 to 40 %
Milcor	Net

BERTSCH TREADLE SHEAR

**SQUARES,
TRIMS
AND
SLITS**

all sheets
14 gauge
or
lighter



Write
for
Catalog
"S"
Today

BERTSCH & CO., Cambridge City, Ind.



**LAMSON
& SESSIONS CO.**

CLEVELAND, OHIO

Plants at Cleveland and Kent, Ohio; Chicago and Birmingham

ROCKFORD

Galvanized
Black
Toncan

24-hour service

ROCKFORD SHEET STEEL CO., Rockford, Ill.

SHEETS

Here's the *Shears*
for every
SHEET METAL SHOP



No. 18
Hand Power

THE
MARSHALLTOWN
LINE

Covered by Patent No. 1020508

**MARSHALLTOWN
Throatless Shears**

THINK of being able to cut all your sheets—up to 18 gauge on one machine. That's what you can do with this mighty handy machine. Straight cutting or curves in any direction on sheets of any width. It's an unusual machine and it is unusually high grade. The blades are extra tough and stay sharp even with hard constant use. The price is easily within the reach of the very smallest shop owner.

Write to Dept. A. A. for full details and price.
Ask for our complete catalog of Sheet Metal Machines.

MARSHALLTOWN MANUFACTURING CO.
Marshalltown, Iowa

DETROIT-CLEVELAND-BUFFALO

THE J.M.&L.A.

OSBORNE

EVERYTHING
USED IN SHEET METAL WORK

ASK FOR CATALOGUE OR PRICES

Have you a puzzling Pattern problem?

Send full details and sketch to American Artisan

An expert will solve the problem for you FREE



VIKING SHEAR

Compound LEVER Handle—Removable Blades

A child can work them

VIKING SHEAR CO., Erie, Pa.

Send for catalog today

Say you saw it in *AMERICAN ARTISAN*—Thank you!

BUYERS' DIRECTORY

Asbestos Paper Products

Sall-Mountain Co., Chicago, Ill.

Air Cleaners

Meyer & Bro. Co., F., Peoria, Ill.
Watt Mfg. Co., Sterling, Ill.

Air Conditioning Machines

Watt Mfg. Co., Sterling, Ill.

Asbestos Paper

Sall-Mountain Co., Chicago, Ill.

Blast Gates

Berger Bros. Co., Philadelphia, Pa.

Blowers—Furnace

Brundage Co., Kalamazoo, Mich.
Lakeside Co., Hermansville, Mich.

Bolts—Stove

Lamson & Sessions Co., Cleveland, Ohio
Ryerson & Son, Inc., Jos. T., Chgo., N. Y., St. L., Det., Cleve.

Brakes—Bending

Dreis & Krump Mfg. Co., Chicago, Ill.
Ryerson & Son, Inc., Jos. T., Chgo., N. Y., St. L., Det., Cleve.

Brakes—Cornice

Dreis & Krump Mfg. Co., Chicago, Ill.

Brass and Copper

American Brass Co., Waterbury, Conn.
Chase Brass & Copper Co., Waterbury, Conn.
Copper & Brass Research Association, New York, N. Y.
Revere Copper & Brass, Rome, N. Y.

Bronze

Revere Copper & Brass, Rome, N. Y.

Cans—Garbage

Diener Mfg. Co., G. W., Chicago, Ill.
Osborn Co., The J. M. & L. A., Cleveland, Ohio

Castings—Malleable

Fanner Mfg. Co., Cleveland, Ohio

Ceilings—Metal

Eller Manufacturing Co., Canton, Ohio
Milwaukee Corrugating Co., Mil., Chgo., La Crosse, Kan. City

Chaplets

Fanner Mfg. Co., Cleveland, Ohio

Cleaners—Vacuum

Brillion Furnace Co., Brillion, Wis.
National Super Service Co., Toledo, Ohio

Copper

American Brass Co., Waterbury, Conn.
Chase Brass & Copper Co., Waterbury, Conn.
Revere Copper & Brass, Rome, N. Y.
Rockford Sheet Steel Co., Rockford, Ill.

Cornices

Eller Manufacturing Co., Canton, Ohio
Milwaukee Corrugating Co., Mil., Chgo., La Crosse, Kan. City

Cut-offs—Rain Water

Eller Manufacturing Co., Canton, Ohio
Milwaukee Corrugating Co., Mil., Chgo., La Crosse, Kan. City

Dampers—Quadrants—Accessories

Eller Mfg. Co., Canton, Ohio
Howes Co., S. M., Boston, Mass.
Milwaukee Corrugating Co., Mil., Chgo., La Crosse, Kan. City
Parker-Kalon Corp., New York, N. Y.

Dampproofings

Lastik Products Corp., Pittsburgh, Pa.

Damper Regulators

Sheer Co., H. M., Quincy, Ill.

Dies—Punch and Press

La Salle Machine Works, Chicago, Ill.

Diffuser—Air Duct

Aeolus-Dickinson Co., Chicago, Ill.

Drills—Electric

Ryerson & Son, Inc., Jos. T., Chgo., N. Y., St. L., Det., Cleve.

Drive Screws—Hardened Metallic

Parker-Kalon Corp., 200 Varick St., New York

Dust Eliminator

Dustless Ash Co., Muskegon, Mich.

Eaves Trough

Barnes Metal Products Co., Chicago, Ill.
Berger Bros. Co., Philadelphia, Pa.
Chase Brass & Copper Co., Waterbury, Conn.
Eller Mfg. Co., Canton, Ohio
Lupton's Sons Co., David, Philadelphia, Pa.
Milwaukee Corrugating Co., Mil., Chgo., La Crosse, Kan. City
Rockford Sheet Steel Co., Rockford, Ill.

Elbow and Shoes—Conductor

Barnes Metal Products Co., Chicago, Ill.
Eller Mfg. Co., Canton, Ohio
Lupton's Sons Co., David, Philadelphia, Pa.
Milwaukee Corrugating Co., Mil., Chgo., La Crosse, Kan. City
Rockford Sheet Steel Co., Rockford, Ill.

Fittings—Conductor

Barnes Metal Products Co., Chicago, Ill.
Braden Mfg. Co., Terre Haute, Ind.
Eller Mfg. Co., Canton, Ohio
Milwaukee Corrugating Co., Mil., Chgo., La Crosse, Kan. City

Flue Thimbles

Milwaukee Corrugating Co., Mil., Chgo., La Crosse, Kan. City

Fluxes—Soldering

Kester Soldering Co., Chicago, Ill.

Furnace Cement

Connors Paint Mfg. Co., Wm., Troy, N. Y.
Eller Mfg. Co., Canton, Ohio
Lastik Products Corp., Pittsburgh, Pa.
Milwaukee Corrugating Co., Mil., Chgo., La Crosse, Kan. City

Furnace Cement—Liquid

Technical Products Co., Pittsburgh, Pa.

Furnace Paste

Larsen-Bennett Co., Omaha, Neb.

Furnace Cleaners—Suction

Brillion Furnace Co., Brillion, Wis.
National Super Service Co., Toledo, Ohio
Williamson Heater Co., Cincinnati, Ohio

Furnace Fans

American Foundry & Furnace Co., Bloomington, Ill.
A-C Mfg. Co., Pontiac, Ill.
Brundage Co., The Kalamazoo, Mich.
Lakeside Co., Hermansville, Mich.
Robinson Co., A. H., Massillon, Ohio
Watt Mfg. Co., Sterling, Ill.

Furnace Regulators

Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Sheer Co., H. M., Quincy, Ill.
White Mfg. Co., Minneapolis, Minn.

Furnace Rings

Eller Mfg. Co., Canton, Ohio
Forest City-Walworth Run Foundries Co., Cleveland, Ohio
Milwaukee Corrugating Co., Milwaukee, Wis.

Furnace Switch—Automatic

Payne Furnace & Supply Co., Beverly Hills, Cal.
Robinson Co., A. H., Massillon, Ohio

Furnaces—Gas

Payne Furnace & Supply Co., Beverly Hills, Cal.
Robinson Co., A. H., Massillon, Ohio
Rudy Furnace Co., Dowagiac, Mich.

Furnaces—Warm Air

Agriola Furnace Co., Gadsden, Ala.
American Foundry & Furnace Co., Bloomington, Ill.
American Furnace Co., St. Louis, Mo.
Beckwith Co., Dowagiac, Mich.
Brillion Furnace Co., Brillion, Wis.
Emrich Co., C., Columbus, Ohio
Farris Furnace Co., Springfield, Ill.
Forest City-Walworth Run Fdy., Cleveland, Ohio
Fox Furnace Co., Elyria, Ohio
Henry Furnace & Fdy. Co., Cleveland, Ohio
Hess Warming & Ventilating Co., Chicago, Ill.
Langenberg Mfg. Co., St. Louis, Mo.
London Furnace Co., London, Ohio
Lennox Furnace Co., Marshalltown, Iowa

Marshall Furnace Co., Syracuse, N. Y.
May Fieberger Furnace Co., Newark, Ohio
Meyer Furnace Co., The., Peoria, Ill.
Midland Furnace Co., Columbus, Ohio
Mt. Vernon Furnace & Mfg. Co., Mt. Vernon, Ill.
Payne Furnace & Supply Co., Beverly Hills, Cal.
Premier Warm Air Heater Co., Dowagiac, Mich.
Peerless Foundry Co., Indianapolis, Ind.
Richardson & Boynton Co., New York, N. Y.
Robinson Co., A. H., Massillon, Ohio
Standard Fdy. & Furnace Co., De Kalk, Ill.
Success Heater Mfg. Co., Des Moines, Iowa
Schwab & Sons Co., R. J., Milwaukee, Wis.
Waterman-Waterbury Co., Minneapolis, Minn.
Western Steel Products Co., Duluth, Minn.
Wise Furnace Co., Akron, Ohio

Gas Burning Attachments

Munkel-Rippel Heating Co., Columbus, Ohio

Grilles

Auer Register Co., Cleveland, Ohio
Harrington & King Perforating Co., Chicago, Ill.
Hart & Cooley Co., New Britain, Conn.
Highton & Sons, Wm., Nashua, N. H.
Independent Register & Mfg. Co., Cleveland, Ohio

Guards—Machine and Belt

Harrington & King Perforating Co., Chicago, Ill.

Handles—Boiler

Berger Bros. Co., Philadelphia, Pa.

Handles—Soldering Iron

Hyro Mfg. Co., New York, N. Y.

Handles—Furnace Door

Fanner Mfg. Co., Cleveland, Ohio

Hangers—Eaves Trough

Berger Bros. Co., Philadelphia, Pa.
Chase Brass & Copper Co., Waterbury, Conn.
Eller Mfg. Co., Canton, Ohio
Lupton's Sons Co., David, Philadelphia, Pa.
Milwaukee Corrugating Co., Mil., Chgo., La Crosse, Kan. City

Heat Regulation Systems

Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Sheer Co., H. M., Quincy, Ill.
White Mfg. Co., Minneapolis, Minn.

Heaters—Cabinet

Fox Furnace Co., Elyria, Ohio
Mt. Vernon Furnace & Mfg. Co., Mt. Vernon, Ill.

Heaters—Combination Hot Water

Alamo Heater Co., Chicago, Ill.
Standard Fdy. & Furnace Co., De Kalk, Ill.

Heaters—Domestic Hot Water

Alamo Heater Co., Chicago, Ill.
Standard Fdy. & Furnace Co., De Kalk, Ill.

Heaters—School Room

Meyer Furnace Co., The., Peoria, Ill.
Western Steel Products Co., Duluth, Minn.

Hotels

Fort Shelby Hotel, Detroit, Mich.

Humidifiers

Diener Mfg. Co., G. W., Chicago, Ill.
Meyer & Bro. Co., F., Peoria, Ill.
Sheer Co., H. M., Quincy, Ill.
Watt Mfg. Co., Sterling, Ill.

Lath—Expanding Metal

Eller Mfg. Co., Canton, Ohio
Milwaukee Corrugating Co., Mil., Chgo., La Crosse, Kan. City

Machines—Crimping

Bertach & Co., Cambridge City, Ind.

Machinery—Culvert

Bertach & Co., Cambridge City, Ind.

Machines—Tinsmith's

Bertach & Co., Cambridge City, Ind.
Dreis & Krump Mfg. Co., Chicago, Ill.
Hyro Mfg. Co., New York, N. Y.
Interstate Machinery Co., Chicago, Ill.
La Salle Machine Works, Chicago, Ill.
Marshalltown Mfg. Co., Marshalltown, Iowa
Osborn Co., The J. M. & L. A., Cleveland, Ohio
Ryerson & Son, Inc., Jos. T., Chgo., N. Y., St. L., Det., Cleve.

Metals—Perforated

Harrington & King Perforating Co., Chicago, Ill.

Miters

Eller Mfg. Co., Canton, Ohio
Milwaukee Corrugating Co., Mil., Chgo., La Crosse, Kan. City

Miters—Eaves Trough

Barnes Metal Products Co., Chicago, Ill.
Berger Bros. Co., Philadelphia, Pa.
Braden Mfg. Co., Terre Haute, Ind.
Eller Mfg. Co., Canton, Ohio
Milwaukee Corrugating Co., Mil., Chgo., La Crosse, Kan. City

Nails—Copper and Brass

Chase Brass & Copper Co., Waterbury, Conn.
Revere Copper & Brass, Rome, N. Y.

(Continued on page 54)



PERFORATED METALS
OF EVERY SORT

carefully made to your specification



Round Holes All Sizes

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Register Faces
Ventilators, etc.
Guard Material for
Machinery and Belts*

*Screens for Grain and
Minerals or Anything
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FLUX-CORE
SOLDER**

ACID-CORE ROSIN-CORE PASTE-CORE
METAL MENDER RADIO SOLDER

Say you saw it in *AMERICAN ARTISAN*—Thank you!

BUYERS' DIRECTORY

(Continued from page 52)

Nails—Hardened Masonry

Parker-Kalon Corp., New York, N. Y.

Oil BurnersCrystal Oil Burner Corp., New York, N. Y.
McIlvaine Burner Corp., Evanston, Ill.**Ornaments—Sheet Metal**Eller Mfg. Co., Canton, Ohio
Mfller & Doing, Inc., Brooklyn, N. Y.
Milwaukee Corrugating Co.,
Mil., Chgo., LaCrosse, Kan. City**Paint**Connors Paint Mfg. Co., Wm.,
Troy, N. Y.**Perforated Metals**Harrington & King Perforating Co.,
Chicago, Ill.**Pipe and Fittings—Furnace**Eller Mfg. Co., Canton, Ohio
Henry Furnace & Fdy. Co.,
Cleveland, Ohio
Lamneck Co., W. E., Columbus, Ohio
Meyer & Bro. Co., F., Peoria, Ill.
Milwaukee Corrugating Co.,
Mil., Chgo., LaCrosse, Kan. City
Osborn Co., The J. M. & L. A.,
Cleveland, Ohio
Peerless Foundry Co.,
Indianapolis, Ind.**Pipe and Fittings—Stove**Meyer & Bro. Co., F., Peoria, Ill.
Milwaukee Corrugating Co.,
Mil., Chgo., LaCrosse, Kan. City**Pipe—Conductor**Barnes Metal Products Co.,
Chicago, Ill.
Berger Bros. Co., Philadelphia, Pa.
Eller Mfg. Co., Canton, Ohio
Milwaukee Corrugating Co.,
Mil., Chgo., LaCrosse, Kan. City**Presses**

LaSalle Machine Works, Chicago, Ill.

Pipe Covering

Sall Mountain Co., Chicago, Ill.

PunchesBertsch & Co., Cambridge City, Ind.
Interstate Machinery Co., Chicago, Ill.
LaSalle Machine Works, Chicago, Ill.
Ryerson & Son, Inc., Jos. T.,
Chgo., N. Y., St. L., Det., Cleve.
W. A. Whitney Mfg. Co., Rockford, Ill.**Punches—Combination Bench and Hand**

Hyro Mfg. Co., New York, N. Y.

Punches—HandHyro Mfg. Co., New York, N. Y.
W. A. Whitney Mfg. Co., Rockford, Ill.**Putty—Stove**Connors Paint Mfg. Co., Wm.,
Troy, N. Y.**Radiator Cabinets**The Hart & Cooley Mfg. Co.,
New Britain, Conn.**Ranges—Gas**Mt. Vernon Furnace & Mfg. Co.,
Mt. Vernon, Ill.**Registers—Warm Air**Auer Register Co., Cleveland, Ohio
Eller Mfg. Co., Canton, Ohio
Forest City-Walworth Run Foundries
Co., Cleveland, Ohio
Hart & Cooley Co., New Britain, Conn.
Henry Furnace & Fdy. Co.,
Cleveland, Ohio
Independent Register & Mfg. Co.,
Cleveland, Ohio
Lamneck & Co., W. E., Columbus, Ohio
Meyer & Bro. Co., F., Peoria, Ill.
Milwaukee Corrugating Co.,
Mil., Chgo., LaCrosse, Kan. City
Rock Island Register Co.,
Rock Island, Ill.
Symonds Register Co., St. Louis, Mo.**Registers—Wood**American Wood Register Co.,
Plymouth, Ind.
Auer Register Co., Cleveland, Ohio
Eller Mfg. Co., Canton, Ohio
Milwaukee Corrugating Co.,
Mil., Chgo., LaCrosse, Kan. City**Regulators—Heat**Minneapolis-Honeywell Regulator
Co., Minneapolis, Minn.
H. M. Sheer Co., Chicago, Ill.
White Mfg. Co., Minneapolis, Minn.**Ridging**American Rolling Mill Co.,
Middletown, Ohio
Eller Mfg. Co., Canton, Ohio
Lupton's Sons Co., David,
Philadelphia, Pa.
Milwaukee Corrugating Co.,
Mil., Chgo., LaCrosse, Kan. City**Rivets—Stove**Lamson & Sessions Co., Cleveland, Ohio
Ryerson & Son, Inc., Jos. T.,
Chgo., N. Y., St. L., Det., Cleve.**Rods—Stove**Lamson & Sessions Co.,
Cleveland, Ohio**Rolls—Forming**

Bertsch & Co., Cambridge City, Ind.

Roofing CementConnors Paint Mfg. Co., Wm.,
Troy, N. Y.
Lastik Products Corp., Pittsburgh, Pa.**Roof Paints**

Lastik Products Corp., Pittsburgh, Pa.

Roof—FlashingEller Mfg. Co., Canton, Ohio
Milwaukee Corrugating Co.,
Milwaukee, Wis.**Roofing—Iron and Steel**American Rolling Mill Co.,
Middletown, Ohio
Central Alloy Steel Corp.,
Massillon, Ohio
Eller Mfg. Co., Canton, Ohio
Inland Steel Co., Chicago, Ill.
Milwaukee Corrugating Co.,
Mil., Chgo., LaCrosse, Kan. City
Osborn Co., The J. M. & L. A.,
Cleveland, Ohio
Ryerson & Son, Inc., Jos. T.,
Chgo., N. Y., St. L., Det., Cleve.**Roofing—Tin**Eller Mfg. Co., Canton, Ohio
Milwaukee Corrugating Co.,
Mil., Chgo., LaCrosse, Kan. City
Taylor Co., N. & G., Philadelphia, Pa.**Rubbish Burners**Hart & Cooley Co.,
New Britain, Conn.**Schools—Sheet Metal Pattern Drafting**St. Louis Technical Institute,
St. Louis, Mo.**Schools—Warm Air Heating**St. Louis Technical Institute,
St. Louis, Mo.**Screws—Hardened Metallic Drive**Eller Mfg. Co., Canton, Ohio
Milwaukee Corrugating Co.,
Mil., Chgo., LaCrosse, Kan. City
Parker-Kalon Corp.,
200 Varick St., New York**Screws—Hardened Self-Tapping, Sheet Metal**Eller Mfg. Co., Canton, Ohio
Milwaukee Corrugating Co.,
Mil., Chgo., LaCrosse, Kan. City
Parker-Kalon Corp.,
200 Varick St., New York**Screens—Perforated Metal**Harrington & King Perforating Co.,
Chicago, Ill.**Shears—Hand and Power**Interstate Machinery Co., Chicago, Ill.
Marshalltown Mfg. Co.,
Marshalltown, Ia.
Ryerson & Son, Inc., Jos. T.,
Chgo., N. Y., St. L., Det., Cleve.
Viking Shear Co., Erie, Pa.**Sheet Metal Screws—Hardened, Self-Tapping**Parker-Kalon Corp.,
200 Varick St., New York**Sheets—Alloy**Central Alloy Steel Co.,
Massillon, Ohio
International Nickel Co.,
New York, N. Y.**Sheets—Black and Galvanized**American Rolling Mill Co.,
Middletown, Ohio
Central Alloy Steel Corp.,
Massillon, Ohio
Eller Mfg. Co., Canton, Ohio
Inland Steel Co., Chicago, Ill.
Milwaukee Corrugating Co.,
Mil., Chgo., LaCrosse, Kan. City
National Association of Flat Rolled
Steel Manufacturers, Cleveland, Ohio
Osborn Co., The J. M. & L. A.,
Cleveland, Ohio
Rockford Sheet Steel Co.,
Rockford, Ill.
Ryerson & Son, Inc., Jos. T.,
Chgo., N. Y., St. L., Det., Cleve.
Taylor Co., N. & G., Philadelphia, Pa.**Sheets—Iron**American Rolling Mill Co.,
Middletown, Ohio
Central Alloy Steel Corp.,
Massillon, Ohio
Eller Mfg. Co., Canton, Ohio
Milwaukee Corrugating Co.,
Mil., Chgo., LaCrosse, Kan. City
Ryerson & Son, Inc., Jos. T.,
Chgo., N. Y., St. L., Det., Cleve.**Sheets—Tin**Taylor Co., N. & G.,
Philadelphia, Pa.**Shingles and Tiles—Metal**Eller Mfg. Co., Canton, Ohio
Milwaukee Corrugating Co.,
Mil., Chgo., LaCrosse, Kan. City**Sifters—Ash**

Diener Mfg. Co., G. W., Chicago, Ill.

Sky LightsEller Mfg. Co., Canton, Ohio
Lupton's Sons Co., David,
Philadelphia, Pa.
Milwaukee Corrugating Co.,
Mil., Chgo., LaCrosse, Kan. City**Smoke Pipe—Cast Iron**

Waterloo Register Co., Waterloo, Ia.

SnipsRyerson & Son, Inc., Jos. T.,
Chgo., N. Y., St. L., Det., Cleve.**Solder—Acid Core**

Kester Solder Co., Chicago, Ill.

Solder—Self-Fluxing

Kester Solder Co., Chicago, Ill.

Solder—Rosin Core

Kester Solder Co., Chicago, Ill.

SolderEller Mfg. Co., Canton, Ohio
Kester Solder Co.,
Milwaukee Corrugating Co.,
Mil., Chgo., LaCrosse, Kan. City**Soldering Coppers**

Revere Copper & Brass, Rome, N. Y.

Soldering FurnacesDiener Mfg. Co., G. W., Chicago, Ill.
Ryerson & Son, Inc., Jos. T.,
Chgo., N. Y., St. L., Det., Cleve.**Specialties—Hardware**

Diener Mfg. Co., G. W., Chicago, Ill.

Stars—Hard Iron Cleaning

Fanner Mfg. Co., Cleveland, Ohio

Statuary

Miller & Doing, Inc., Brooklyn, N. Y.

Stove Pipe ReducersEller Mfg. Co., Canton, Ohio
Milwaukee Corrugating Co.,
Mil., Chgo., LaCrosse, Kan. City **Tinplate**Eller Mfg. Co., Canton, Ohio
Milwaukee Corrugating Co.,
Mil., Chgo., LaCrosse, Kan. City
Osborn Co., The J. M. & L. A.,
Cleveland, Ohio
Taylor Co., N. & G., Philadelphia, Pa.**Tools—Tinsmith's**Bertsch & Co., Cambridge City, Ind.
Dries & Krump Mfg. Co., Chicago, Ill.
Hyro Mfg. Co., New York, N. Y.
Interstate Machinery Co., Chicago, Ill.
Osborn Co., The J. M. & L. A.,
Cleveland, Ohio
Rockford Sheet Steel Co.,
Rockford, Ill.Ryerson & Son, Inc., Jos. T.,
Chgo., N. Y., St. L., Det., Cleve.
Viking Shear Co., Erie, Pa.**Torches**Diener Mfg. Co., G. W., Chicago, Ill.
Ryerson & Son, Inc., Jos. T.,
Chgo., N. Y., St. L., Det., Cleve.**Trade Extension**Copper & Brass Research Association
National Association of Flat Rolled
Steel Manufacturers, Cleveland, Ohio
Sheet Steel Trade Extension
Committee, Cleveland, Ohio**Trimnings—Stove and Furnace**

Fanner Mfg. Co., Cleveland, Ohio

Vacuum Cleaner—FurnaceBrillion Furnace Co., Brillion, Wis.
National Super Service Co.,
Toledo, Ohio**Ventilators**Aeolus Dickinson Co., Chicago, Ill.
Berger Bros. Co., Philadelphia, Pa.
Eller Mfg. Co., Canton, Ohio
Lupton's Sons Co., David,
Philadelphia, Pa.
Milwaukee Corrugating Co.,
Mil., Chgo., LaCrosse, Kan. City**Ventilators—Ceiling**Hart & Cooley Co., New Britain, Conn.
Henry Furnace & Fdy. Co.,
Cleveland, Ohio**Windows—Steel**Lupton's Sons Co., David,
Philadelphia, Pa.**Wood Faces—Warm Air**Auer Register Co., Cleveland, Ohio
American Wood Register Co.,
Plymouth, Ind.
Eller Mfg. Co., Canton, Ohio
Milwaukee Corrugating Co.,
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A fuel saver and generating machine of the finest quality made at the price.

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TERRE HAUTE - INDIANA

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Now we have gotten out a New Tin, but the best machine made plate ever produced, for those who want to pay less. This is known as

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WANTS AND SALES

Yearly subscribers to the AMERICAN ARTISAN may insert advertisements of not more than fifty words in our Want and Sales Columns WITHOUT CHARGE for three insertions.

Such advertisements, however, must be limited to help or situation wanted, tools or equipment for sale, to exchange or to buy, business for sale or location desired, and must reach our office ten days prior to date of publication. This privilege is not extended to manufacturers or jobbers—or those making a business of buying and selling used machines—employment agencies and brokers.

When sending advertisement state whether your name or blind number is to be used.

BUSINESS CHANCES

Lightning Rods—Dealers who are selling Lightning Protection will make money by writing to us for our latest Factory to Dealer Prices. We employ no salesmen and save you all overhead charges. Our Pure Copper Cable and Fixtures are endorsed by the National Board of Fire Underwriters and hundreds of dealers. Write today for samples and prices. L. K. Diddle Company, Marshfield, Wis.

Wanted to Buy—Small sheet metal shop in town of 10,000 or less. Prefer Arkansas, Mississippi or Georgia—or will buy half interest in shop. This must be a shop making money. Will pay part cash and balance monthly. Address W. H. S., 1505 Arlington Ave., Bessemer, Ala. Z-518

For Sale—Well equipped plumbing, heating and sheet metal shop. Only shop in town of 1,600 population. Centrally located. Six good sized living rooms in connection. Good chance for a hustler. Address A-519, AMERICAN ARTISAN, 139 N. Clark St., Chicago, Ill.

For Sale in DuQuoin, Ill.—An old established tinshop. Must sell on account of ill health. Will rent building reasonably. Inquire Fred Steinwax, Box 175, DuQuoin, Ill. B-519

Business for Sale—Sheet metal and plumbing shop; good equipment, good town, and worth the money. Address F-518, AMERICAN ARTISAN, 139 N. Clark St., Chicago, Ill.

For Sale—Sheet metal, radiator, fender and body repair shop, including welding machine and blacksmith shop. Doing fine business and plenty of work. I have made enough money and wish to retire. Will sell for \$3,000.00. Address George Warga, Box 325, Live Oak, Fla. G-518

For Sale—Combination tin and plumbing shop in one of the best little towns in Nebraska. Other business to occupy my time, reason for selling. Address R-520, AMERICAN ARTISAN, 139 N. Clark St., Chicago, Ill.

SITUATION WANTED

This is addressed to a manufacturer who harps on quality furnaces and intelligent installations. If such a manufacturer needs a salesmanager or assistant sales manager, I would like to hear from him. For ten years I helped market a well known furnace. Served in sales promotion and advertising departments, as a salesman, and as branch manager. Thorough investigation as to character and ability invited. Communications strictly confidential. Address F-519, AMERICAN ARTISAN, 139 N. Clark St., Chicago, Ill.

SITUATION WANTED

First class sheet metal worker and furnace man desires position west of the Mississippi, preferably southwest. Understands Standard Code installations from both engineering and installation viewpoint. Can cut most patterns, lay slate, and some knowledge of plumbing, fender and body work. Like to hook up with furnace concern in engineering department; 18 years' general experience. Address G-520, AMERICAN ARTISAN, 139 N. Clark St., Chicago, Ill.

Situation Wanted—By thoroughly experienced salesman who can sell a good line of steel furnaces and furnace accessories. Have had 25 to 30 years' experience in the furnace business and can show a good clean record as a sales producer. Prefer Ohio, Eastern Ohio or Western Ohio, as I am best known in these sections. Best of references. Address R-518, AMERICAN ARTISAN, 139 N. Clark St., Chicago, Ill.

Situation Wanted—By first class tinner and sheet metal mechanic at all branches of trade, including ventilation, dairy equipment, furnaces and outside work. Steady and reliable and can furnish best of references as to ability for taking charge of men and getting results. 48 years of age and in good health. Chicago or near by preferred. Address J-520, AMERICAN ARTISAN, 139 N. Clark St., Chicago, Ill.

Experienced furnace salesman is open for contract. Thoroughly understands warm air heating and forced ventilation. Would be interested in contacting reliable dealer in good town to help combat chain competition. Can take complete charge of installation if necessary. Address K-518, AMERICAN ARTISAN, 139 N. Clark St., Chicago, Ill.

Position Wanted—I am looking for connection with some well known, high grade furnace and boiler concern, or for a boiler or furnace concern separately; 19 years with last concern. Want connection with concern with A-1 reputation and with high quality merchandise. Address O-518, AMERICAN ARTISAN, 139 N. Clark St., Chicago, Ill.

Position Wanted—By first class metal worker and furnace man with plumbing experience. Can take charge of shop, lay out work, and sell goods. Married, family, strictly sober. Prefer Western Iowa, Eastern Nebraska, South Dakota or Southwestern Minnesota. Can come at once. Address J. P. Nelsen, 3332 Garrettsboro Ave., Sioux City, Iowa. A-517

Would like to get in touch with hardware company, Nebraska preferred, who can use a middle aged combination plumber, fitter and general heating man. Steady and reliable. Can do estimating and layout. Address L-518, AMERICAN ARTISAN, 139 N. Clark St., Chicago, Ill.

Having sold my share of hardware business, with 20 years' experience in plumbing, hot air, steam and hot water heating, sheet metal, pump and windmill, farm machinery and electrical work, would consider year 'round job anywhere. 45 years of age, married and industrious. Address Chas. F. Fisher, Cazenovia, Wis. H-520

Situation Wanted—By a first class sheet metal worker; 25 years' experience. Can read blue prints, cut patterns and handle any kind of sheet metal work that may come to job shop. Employed at present but wish to make change. Can go anywhere. Address P. O. Box 681, Dothan, Ala. M-518

Situation Wanted—By first class sheet metal worker and furnace setter. Can take full charge of shop and do estimating; 28 years of experience. Can furnish good references. Married and sober. Address B. J. Hawkins, 314 N. Howell St., Owosso, Mich. P-518

Situation Wanted—Superintendent, ventilation, humidity, blower systems; industrial, manufacturing and production; layout, fabrication and erection. Any location. Address J-518, AMERICAN ARTISAN, 139 N. Clark St., Chicago, Ill.

Situation Wanted—By practical tinner and furnace installer. Reliable, competent workman, active and steady. Good on gutters and all outside work. Can start at once. Address E-519, AMERICAN ARTISAN, 139 N. Clark St., Chicago, Ill.

Position Wanted—By a real furnace man, tinner, roofer, estimator and producer. Wages reasonable. Address D-519, AMERICAN ARTISAN, 139 N. Clark St., Chicago, Ill.

SITUATION WANTED

Situation Wanted—Sheet metal worker, thoroughly experienced in pattern drafting, ventilating, blowpipe and general furnace work, desires position in or near Chicago. 20 years' experience. Young, industrious, sober, reliable family man. Desire steady job. Address K-520, AMERICAN ARTISAN, 139 N. Clark St., Chicago, Ill.

Situation Wanted—By licensed master plumber, steam and hot water fitter, 16 years of experience in estimating the above work. Have \$1,000 to invest in good paying shop. Can furnish best of references as to ability and honesty. Address L-520, AMERICAN ARTISAN, 139 N. Clark St., Chicago, Ill.

Situation Wanted—Licensed plumber, steam fitter, warm air heating, tinsmith, wants position in small town only. Thoroughly practical. Wages to suit. Address Jess Wildrick, Gen. Del., Detroit, Mich. M-520

Situation Wanted—Young man with seven years' experience, desires a position as plumber, tinner and sheet metal worker. First class, reliable and steady. Heinrich Albers, 1565 N. Halsted St., Chicago, Ill. C-519

HELP WANTED

Wanted—Five sheet metal workers, one experienced foreman, also experienced solicitor and estimator. Large shop, well equipped, doing cornice, skylight, ventilating, blow pipe and general sheet metal work on a large scale. Address L-519, AMERICAN ARTISAN, 139 N. Clark St., Chicago, Ill.

Wanted—Good all around tinner and furnace man. Steady employment and good opportunity for right man. Must be sober and able to furnish reference. Protestant. City of 7,000. Address T-518, AMERICAN ARTISAN, 139 N. Clark St., Chicago, Ill.

Would like to get in communication with a good plumber and tinner, one that can do acetylene welding and cutting; also good on repairing auto radiators; \$1.00 per hour. Union man preferred, and one who can drive a Dodge truck. Address Robert E. Hearst, Kane, Pa. K-519

HELP WANTED

Wanted—Combination Plumber and Sheet Metal Worker. Must be neat, clean and sober. State wages wanted in first letter. Address O-520, AMERICAN ARTISAN, 139 N. Clark St., Chicago, Ill.

Wanted—Experienced plumber's helper and plumber who can do some tinning preferred but not necessary. State wages and ability in first letter. Address S. W. Lacey, Mackinac Island, Mich. H-519

Wanted—Experienced hardware clerk, one able to do book work. Address Randolph Hardware Co., Randolph, Wis. S-518

TOOLS AND MACHINES

For Sale—One Marshalltown throatless shear, brand new. One set 24-in. forming rolls. One grooving machine. One roof double seamer and two pairs of tongs for same. Will take \$50 for the lot. Shears alone cost \$40. Address B-520, AMERICAN ARTISAN, 139 N. Clark St., Chicago, Ill.

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Wanted to Buy—One 4-ft. cornice brake in good working condition and at a bargain. Write me, giving your description and best price. Address S. E. Ethridge, 1103 Denison, Little Rock, Ark. W-519

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TOOLS AND MACHINES

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For Sale—Complete welding outfit, suitable for auto body and fender work, cheap. Also body tools. Address Kimball Tin and Radiator Shop, Kimball, Neb. M-519

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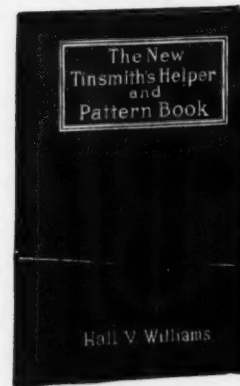
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